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RESPONSIVENESS SUMMARY
MONTANA POLE AND TREATING PLANT
NATIONAL PRIORITIES LIST SITE
BUTTE, MONTANA

Montana Department of Health & Environmental Sciences
Solid & Hazardous Waste Bureau
Cogswell Building
Helena, Montana 59620
(lead agency)

(support agency)
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Region VIII - Montana Office
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ACRONYMS

ARCO	Atlantic Richfield Company
ATSDR	Agency for Toxic Substances and Disease Registry
BRA	Baseline Risk Assessment
BN	Burlington Northern Railroad
BSB	Butte-Silver Bow
CTEC	Citizens Technical Environmental Committee
DNAPL	Dense Non-Aqueous Phase Liquid
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
OSWER	Office of Solid Waste and Emergency Response
LAO	Lower Area One
LNAPL	Light Non-Aqueous Phase Liquid
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDHES	Montana Department of Health and Environmental Sciences
MPTP	Montana Pole and Treating Plant
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear Aromatic Hydrocarbon
PCP	Pentachlorophenol
PRAG	Preliminary Remedial Action Goal
PRP	Potentially Responsible Party
RA	Remedial Action
RD	Remedial Design
RfD	Reference Dose
RI	Remedial Investigation
ROD	Record of Decision
TEF	Toxicity Equivalency Factor

MONTANA POLE RESPONSIVENESS SUMMARY

1.0. INTRODUCTION

The Montana Pole and Treating Plant (MPTP) in Butte, Montana operated as a wood treating facility from 1946 to 1984. In 1983, uncontrolled releases of woodtreating chemicals were reported seeping from the groundwater into nearby Silver Bow Creek. That year, the Montana Department of Health and Environmental Science requested the owner of MPTP to conduct preliminary site investigations to determine the extent of contamination. The initial investigations identified surface and subsurface soil contamination, groundwater contamination, and a layer of product floating on the groundwater.

Due to the conditions present at the site and the inability of the owner, Mr. Torger Oaas, to finance any additional investigations, the U.S. Environmental Protection Agency (EPA) performed a Time Critical Removal Action in 1985. This initial action addressed site security, product collection from the seeps on the bank of Silver Bow Creek, the excavation and storage of highly contaminated soils on-site, and a product recovery system to collect "free" product floating on the groundwater. Subsequent removal actions were also undertaken by EPA. The facility was included on the National Priority List for Superfund sites on July 22, 1987.

In June 1990, the Atlantic Richfield Company (ARCO) began conducting a remedial investigation and feasibility study (RI/FS) at the site under a consent order with the Montana Department of Health and Environmental Sciences (MDHES). The RI/FS which was completed in March 1993, defined the nature and extent of contamination at the site and developed and evaluated alternatives for remediating the contamination.

MDHES, with the concurrence of the EPA, released a Proposed Plan for the site on May 7, 1993. A public comment period was held from May 7, 1993 through July 7, 1993. On May 25, 1993, MDHES held a public hearing to explain the Proposed Plan, to outline the agencies preferred alternative for cleanup, and to allow the public to submit formal comments. Throughout the public comment period, MDHES has received numerous comments, both oral and written, on the Proposed Plan, supporting documents and the Administrative Record. This Responsiveness Summary presents MDHES's responses to the comments received.

1.1 Community Involvement Background

MDHES has conducted community involvement activities for the Montana Pole and Treating Plant site in accordance with state and federal laws and EPA Superfund guidance documents. Additionally, MDHES's philosophy is that the citizens of Montana, and especially residents living near Superfund sites, will be most affected by the decisions of the agency and therefore should have the opportunity to be actively involved in the decision making process.

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1.1.1 Public Meeting Publicity

Press releases were sent to the media mailing list before each public meeting and to announce public comment periods. The press mailing list includes all media (print and electronic) in Butte as well as news services and several magazines. In addition, these meetings were advertised in local papers and/or on a local radio station. Print advertisements were display style, conspicuously large (at least two columns by five inches) in a widely read section of the local paper. Radio advertisements were run on an AM and FM station in a variety of time slots, for several days before the meeting.

1.1.2 Administrative Record

The Administrative Record is the set of documents identified for the Site upon which the selection of the remedy is based. The Administrative Record is required by CERCLA §113(k). The index of the Administrative Record is provided in Appendix B of the Record of Decision.

The Administrative Record is available for public review at the Montana Tech Library in Butte and the MDHES Superfund Program office in Helena.

1.1.3 Document Repositories

Site documents and other information have been, and will continue to be, made available to the public near the Site. MDHES has established repositories of site documents for check-out at the Butte-Silver Bow Public Library, the Montana Tech Library, the Butte EPA office in the basement of the courthouse, the State Library, and MDHES Superfund offices in Helena. MDHES adds documents to the repository as quickly as possible after publication.

1.1.4 Citizens Groups

In 1992, the Citizens Technical Advisory Committee (CTEC) received an EPA \$50,000 technical assistance grant for the Montana Pole site. CTEC has regular monthly meetings. Often the Montana Pole site is on the agenda. MDHES and EPA site staff attend those meetings and are also available by phone or in person as questions arise. MDHES and EPA have conducted site tours for the CTEC board and staff.

MDHES and EPA have also worked closely with the Clark Fork - Pend Oreille Coalition of Missoula. In late 1992, the Coalition hired a staff member who works on upper Clark Fork issues in an office in Butte. MDHES and EPA stay in regular contact with this staff member about Montana Pole issues. This staff member also became a member of the CTEC board of directors in spring 1993.

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1.1.5 Progress Reports

MDHES publishes progress reports which contain information on recently released documents, upcoming meetings, site activities, completion of projects, sampling results, etc. Progress reports are sent to those people on the site mailing list. Extra copies are distributed to pamphlet racks at a number of public locations. MDHES and EPA keep extra copies of progress reports on file for distribution.

1.1.6 Toll-free Hotline

The MDHES Superfund Program in-state toll-free number, 1-800-648-8465, was established in June 1987 and has proven to be an effective tool for the public as well as MDHES at the Montana Pole Site. The public may be more willing to call MDHES offices when they know it is a toll-free call. The MDHES Superfund public information officer answers hotline calls and responds to questions. Technical questions are directed to the State Project Officer. The hotline is answered in person during business hours and is served by an answering machine during evenings and weekends.

1.1.7 Mailing List

At MDHES, the site mailing list is maintained on a computer database and is updated periodically. MDHES actively solicits additions to the mailing list in the progress reports and at public meetings. In accordance with state law, the mailing list is retained as confidential information by MDHES and is not distributed.

1.2 Chronology of Community Relations Activities

1988

April 13, 14, 18 -

MDHES conducted community relations interviews in Butte in preparation of the Montana Pole Community Relations Plan.

August 31 -

MDHES arranged for Montana Tech Library to house a document repository.

1989

September -

MDHES released a community relations plan for the site.

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1990

Jan. 1 -

MDHES issued a press releases discussing Volume I of the RI/FS work plan.

May -

MDHES released the complete Remedial Investigation/Feasibility Study workplan. MDHES held a public meeting May 9 at 7 p.m. at Montana Tech to present the workplan. The meeting was publicized by MDHES with a press release, advertisements in the Montana Standard May 6 and 8, and public service announcements. MDHES published and mailed a four-page progress report summarizing the work plan.

June and July 1990 -

MDHES placed the administrative record at Montana Tech Library in Butte.

MDHES announced the placement with progress report to the site mailing list and a legal ad in the Montana Standard on June 14.

1991

March -

MDHES published and mailed a progress report about the risk assessment to the site mailing list. MDHES held a public meeting March 20 at 7 p.m. at Montana Tech to discuss the risk assessment. MDHES advertised the meeting in the progress report and in display ads in the Montana Standard on March 15 and 19 and also mailed out a press release March 13.

March 15 -

MDHES issued a press release about a leak and spill from an oil holding tank at the site.

November and December -

MDHES released the Alternatives Screening Document. MDHES issued a press release and ran an ad in the Montana Standard. The ad ran Dec. 7, 9, and 10.

April -

MDHES coordinated a site visit for Dr. Leslie Hutchinson of the Agency for Toxic Substances and Disease Registry in Atlanta. On April 17, MDHES took Dr. Hutchinson to Butte to meet with a concerned neighborhood resident and the local health department.

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May 12 -

MDHES met with CTEC staffer Heide Leighty to discuss Montana Pole site - introductory meeting

May and June -

MDHES arranged a site tour and meeting with CTEC for Susan Muza of the Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR visited the site on June 1.

June 10 -

MDHES attended the CTEC meeting in Butte. The Montana Pole risk assessment, health issues, remedial investigation and ATSDR visit were discussed.

July -

MDHES attended the CTEC meeting. The relationship between the Montana Pole site and Lower Area One (LAO) was discussed.

August and September -

MDHES held a comment period on the Draft Risk Assessment from August 15 - Sept. 30. MDHES ran a legal ad in Montana Standard on Aug. 13 and held a public meeting Thursday, August 20, at 7 p.m. at the Boulevard Fire Hall. The display ad for the public meeting was printed in the progress reports which were mailed Aug. 12 to the site mailing list as well as Boulevard and Williamsburg residents. The ad was also published in the Montana Standard Aug. 15, 17, and 18. MDHES issued a press release about the public meeting and comment period. MDHES placed approximately 50 posters around Butte in grocery stores, restaurants, bars, the courthouse and other public buildings.

Aug. 12 -

MDHES attended the monthly CTEC meeting in Butte to present an update of events at the site.

October -

MDHES issued a press release about a legal settlement with Miner's Bank.

November -

MDHES published and mailed a progress report about the selection of remedial alternatives.

Nov. 24 -

MDHES staff met informally with CTEC staff to discuss site status.

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Nov. 30 and Dec. 1 -

CTEC and MDHES went door-to-door in Williamsburg and Boulevard to deliver public meeting (Dec. 10) flyers.

Dec. 1 -

MDHES staff met informally with the Clark Fork - Pend Oreille Coaliton and CTEC to discuss the upcoming public meeting which was co-sponsored by CTEC.

Dec. 10 -

MDHES held a press meeting at 2:00 and public workshop at 7 p.m. at the Boulevard Fire Hall. MDHES publicized the meeting on KBOW Radio in twenty-five 30-second spots and in the Montana Standard on Dec. 4, 6, and 9 in a display ad. MDHES issued a press release on Dec. 2.

Dec. 11 -

MDHES met with CTEC as a follow-up to the public workshop the previous evening and to discuss potential cleanup alternatives.

1993

Jan. 27

MDHES attended a special CTEC meeting. An EPA incineration expert was the main speaker. CTEC was concerned about incineration at the Montana Pole site.

Feb. 4 -

MDHES attended a special CTEC meeting and presented bioremediation.

March -

MDHES published and mailed progress reports outlining the comments and concerns voiced by the public at the Dec. 10, 1992, public meeting about selection of alternatives.

April 2 -

MDHES published and mailed progress reports outlining the results of the remedial investigation.

April 27 -

MDHES arranged and assisted in conducting a site tour for National Park Service staff.

May 3 -

MDHES sent out proposed plans to the site mailing list, Williamsburg and Boulevard.

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The display ad and legal ad for the proposed plan was published in the Montana Standard May 7.

May 5 -

In accordance with CECRA law, MDHES sent a letter to Butte city/county officials notifying them of the availability of the proposed plan and feasibility study.

May 7 -

MDHES began the 30-day proposed plan comment period. MDHES sent proposed plans to all people in Williamsburg and the Boulevard.

May 11 -

MDHES attended the monthly CTEC meeting and presented the proposed plan.

May 25 -

MDHES held the official public hearing on the proposed plan and preferred alternative. MDHES publicized the meeting with display ads in the Montana Standard May 21, 21, 24 and 25. MDHES sent postcards about the hearing to the entire mailing list and all of Boulevard and Williamsburg residents. On the day of the meeting, MDHES met with Dennis Nettles of KBOW. The hearing was held at 7 p.m. at the Butte Community Center at 25 West Front Street in Butte. MDHES officially announced the 30-day extension of the public comment period.

June 8 -

MDHES published a legal ad in the Montana Standard for the extension of the proposed plan comment period. MDHES also sent postcards to the entire mailing list as well as Boulevard and Williamsburg residents.

1.3 Explanation of Responsiveness Summary

Four types of comments were received by MDHES on the Proposed Plan and during the public comment period. These were:

- Comments presented at the public hearing held on May 25, 1993 in Butte, Montana. These comments were recorded and transcribed by a court reporter. In addition, some commenters at the public hearing submitted written materials for the record. A copy of the transcript of the public hearing, including formal comments and written materials, is provided in Appendix A. Responses to these comments are found in Section 3.0.
- Oral comments received by telephone at MDHES offices during the comment period. These comments were recorded, if the caller gave permission, and were later

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transcribed by MDHES. Copies of these comments are provided in Appendix B. Responses to these comments are found in Section 4.0.

- Written comments received by MDHES during the comment period. Copies of these comments are provided in Appendix C. Responses to these comments are found in Section 5.0.
- Written comments and information received by MDHES after the comment period ended. These comments are provided in Appendix D. Although MDHES was not obligated to respond to these comments, MDHES has done so in this Responsiveness Summary. Responses to these comments are found in Section 6.0.

Comments were received from the following groups and individuals:

- Butte-Silver Bow Government
- Rocker Water and Sewer District
- 1 Local State Representative
- 1 local citizens group
- 2 Montana environmental groups
- 3 Potentially Responsible Parties (PRPs)
- 15 private citizens
- 1 former pole plant worker

It should be noted that while only formal public comments are presented and responded to in this responsiveness summary, MDHES has also considered other information in the remedy selection process. MDHES has considered information from meetings held between MDHES, EPA, ARCO, the other PRPs and other parties during the RI/FS and during the public comment period. Also, MDHES has closely considered ARCO's written submittals including their ARARs scoping documents, institutional controls documents, risk assessment scoping documents, the position paper on the RI and FS reports and other correspondences related to the RI/FS and remedy selection. These comments are addressed, either explicitly or implicitly, in the ROD and Responsiveness Summary.

All comments received, including those provided to MDHES outside the comment period, have been reviewed and considered by MDHES in the decision making process and are addressed in this Responsiveness Summary. In order to avoid duplication of responses, similar comments are generally only addressed once and thereafter referenced to the appropriate response. Also, a number of comments which were provided by several of the commenters are considered by MDHES to require special consideration due to the complexity of the issues. These comments are addressed in Section 2.0.

The major concerns expressed during the RI/FS process focused on the level of cleanup, the

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permanence of the cleanup and the ultimate land use at the site. Although concerns were raised related to aspects of implementability, effectiveness and cost of the preferred remedy. Butte-area residents overwhelmingly supported the agencies' preferred remedy.

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2.0 GENERAL RESPONSES TO COMMENTS

Many of the comments received during the public comment period focused on similar issues. Those comments that MDHES considers to be most significant in relation to the decision making process are addressed in Sections 2.1 through 2.6.

2.1 Consideration of Residential Land Use at the Site.

Many comments, particularly those received from the PRPs, questioned MDHES's justification for evaluating residential land use at the site and for using potential residential land use in addition to industrial and recreational land uses as criteria for developing preliminary cleanup goals and cleanup alternatives.

MDHES determined that residential land use was a current and likely future land use at the site for the following reasons:

- Current local zoning ordinances allow residential land use over the entire site; and
- Installation of domestic (drinking) wells is allowed by local ordinance over most of the site.
- A residence has been and is currently established on the site;
- Site groundwater has been used in the past for domestic purposes by the on-site residence;
- The industrial facility at the site has been abandoned and land use is likely to change from past uses;

The site is currently zoned by Butte-Silver Bow (BSB) as M1 and M2 industrial land use categories. These zoning designations allow the establishment of caretaker or business owner residences. In the past, Torger Oaas, as owner of the Montana Pole and Treating Plant, established his residence on site. In the future, other business owners could do the same as allowed by zoning.

Many comments focused on the well ban in place in Butte which is thought to prohibit domestic use of groundwater in the area. Although Butte-Silver Bow enacted a domestic use well ban in 1992, close reading of the ordinance language shows that this ban only applies to areas within 300 feet of a city water main. MDHES understands that the nearest water main to the MPTP site is at Greenwood Avenue which runs adjacent to the south side of the site. The majority of the site (and site contamination) is beyond the 300 foot limit, thus installation of domestic use groundwater wells would be legal. Therefore, the majority of the Montana Pole site could have residences established on it and those residences could construct wells for domestic water supplies under current zoning and groundwater restrictions.

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Given the above, MDHES believes that it was reasonable and prudent to analyze potential risks from all types of land use including residential use at the site in the risk assessment. It was also reasonable to develop Preliminary Remedial Action Goals for residential land use and to consider all types of land use in developing and evaluating cleanup alternatives in the Feasibility Study. By doing so, MDHES produced risk information necessary for risk managers to make informed decisions about all potential land use scenarios at the site.

MDHES recognizes that the PRPs, and in particular ARCO, are attempting at this time to place restrictions on land and groundwater use at the site through zoning changes, restrictive covenants and ordinance enactment. In addition, Butte-Silver Bow government has expressed a willingness to allow such restrictions. MDHES and EPA feel that it is reasonable to anticipate the PRPs and Butte-Silver Bow will implement permanent prohibitions on residential land use at the site. Therefore, in anticipation of these changes, the agencies have modified the cleanup levels and points of compliance for the remedial action appropriately. These modifications are presented in the Record of Decision (ROD) Section XI - Documentation of Significant Changes.

2.2 Justification for Taking Cleanup Action.

The PRPs questioned the agencies' justification for taking cleanup action at the site considering that risks to industrial and recreational land users are shown in the Baseline Risk Assessment (BRA) be within EPA's "acceptable" risk range of 10^{-4} to 10^{-6} . One PRP stated that EPA guidance (OSWER Directive 9355.0-30) requires justification for remedial actions where risks fall within 10^{-4} to 10^{-6} and the Proposed Plan does not provide any compelling reasons that significant remedial action is necessary at the site.

As explained in Section 2.1 above, during the RI/FS process MDHES believed that residential land use at the site was likely considering past land use, current land use and current institutional controls. The risk assessment determined that risks to potential residential users would be greater than EPA's risk range of 10^{-4} to 10^{-6} which is justification for taking remedial action.

Even assuming, however, that industrial or recreational land use were the only likely land use scenarios, cleanup action at the site is still justified. As outlined in OSWER Directive 9355.0-30, where risk is less than 10^{-4} "action generally is not warranted unless there are adverse environmental impacts. However, if MCLs or non-zero MCLGs are exceeded, action generally is warranted." (MCL refers the Safe Drinking Water Act Maximum Contaminant Levels and MCLGs refer to MCL goals.)

At the Montana Pole site there are adverse environmental impacts and MCLs are exceeded. Continued releases of contaminated groundwater to Silver Bow Creek are occurring causing exceedances of both MCLs and aquatic water quality criteria in the creek. Approximately 90

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million gallons of site groundwater exceed the MCL for pentachlorophenol (PCP). In addition, the estimated 370,000 gallons of uncontrolled woodtreating fluids floating on top of the groundwater table is a continuing threat to human health and the environment. The OSWER Directive goes on to state "where...there is a significant possibility that a release will occur that is likely to result in an unacceptable risk, remedial action may also be taken."

MDHES believes that the agencies have clear justification for taking remedial action at the site.

2.3 Technical Discrepancies in the RI and FS Reports

Comments received from Burlington Northern Railroad (BN) identified numerous discrepancies in the RI and FS reports. Many of these discrepancies involved apparent transcription errors and typographical errors in the text, tables and figures. In some instances the RI tables and figures do not agree with the final data summary tables provided in Appendix L of the RI report. Some data from the final data tables was not reported in the RI and other data was reported inaccurately. Additionally, BN had questions regarding the presentation of historical features at the site, statistical evaluation of data, aquifer characteristics and groundwater flow calculations.

MDHES has thoroughly reviewed all the comments received related to these document problems. None of the discrepancies identified are considered by MDHES to have a significant effect on the overall conclusions of the RI, BRA, FS or the Proposed Plan.

Sampling data collected during the MPTP remedial investigation underwent vigorous quality control measures to ensure that the data was accurate and reliable. MDHES believes that the final approved data summary tables (also provided in Appendix L of the RI Report) provide a substantial and accurate data base for purposes of determining nature and extent of contamination and remedy selection. In spite of the discrepancies between Appendix L and the RI Report, the nature and extent of contamination at the site are adequately described in the RI report and provide the necessary information for screening, development and analysis of alternatives in the FS report. In addition, human health and environmental risk assessment calculations are based on the more accurate final data tables rather than the tables and figures found in the RI report. MDHES is confident that the risk assessment calculations are accurate.

Due to the number of the discrepancies, and in order to provide the most accurate information possible on the site for use in the remedial design and remedial action phase of site cleanup, MDHES will request that ARCO address all of BN's specific comments and conduct further checking of the information provided in these documents so that all discrepancies are identified and corrected. If appropriate, corrected material will be placed in the administrative record.

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2.4 Implementability and Long Term Effectiveness of the Preferred Alternative

Several commenters questioned MDHES's determinations concerning implementability and long-term effectiveness of the preferred alternative. In addition, some comments specifically raised concerns that excavation would cause a spread of contamination and cause additional contamination to dissolve into the groundwater. Also, it is argued that since not all of the source material can be recovered through excavation, groundwater cleanup goals will not be attained.

As stated in the FS and Proposed Plan, the preferred alternative is implementable. MDHES recognizes that excavation of source materials to slightly below the groundwater table will be more difficult than excavation above the water table. However, below-groundwater excavation has been conducted previously at the site by EPA and in areas immediately adjacent to the site by ARCO.

During removal actions at the site in the mid-1980s, EPA installed interception trenches and recovery trenches to approximately five feet below the water table. Thousands of gallons of LNAPL were recovered from these open trenches over a construction season. According to the EPA On Scene Coordinator for the trenching activities, no major problems were encountered during these activities. Available site photographs support this and indicate no problematic emulsification of oils, sloughing of walls, or spreading or smearing of contamination occurred during excavation.

With regard to long-term effectiveness, it is clear to MDHES that the remedy which treats the greatest quantity of source material including LNAPL (Alternative 5) has the highest likelihood of providing cleanup to a point where discontinuation of long-term site controls is achieved. With only limited removal of LNAPLs under the other alternatives, it is certain that effective engineering and institutional controls would be required indefinitely. Indefinite reliance upon engineering and institutional controls inherently results in continual potential risks from the site which would be clearly greater than if the source material were treated as proposed in Alternative 5. Thus MDHES considers Alternative 5 to provide the highest degree of long term effectiveness and permanence of all the alternatives considered.

In comments submitted by the PRPs it was suggested that, after excavation of materials above the water table, tilling and in-situ biological treatment of contamination at and below the water table may be an effective alternative to excavation of these materials. In consideration of these comments, the selected remedy allows for such an approach if it would be more practicable and effective than excavation.

MDHES recognizes the difficulty of remediating the contaminated groundwater at the site to drinking water standards and a reliable prediction on whether the preferred alternative will attain drinking water criteria in groundwater throughout the site cannot be made. Under the

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selected remedy, high strength source materials including LNAPLs will be removed through excavation in accessible areas to the extent practicable. Materials at and below the water table may be biologically treated in place, as suggested by the PRPs, if more practicable and effective than excavation. Soil flushing and LNAPL recovery will be implemented in inaccessible areas to remove source materials. Contamination that remains after these actions will consist of residual LNAPL and contaminated soil and dissolved phase groundwater contamination which can be effectively remediated by long-term in-situ bioremediation. MDHES believes that these components of the selected remedy provide the highest degree of groundwater remediation practicable.

2.5 Consideration of Infiltration Galleries

As part of EPA's removal actions at the site in the mid-1980s, infiltration galleries were installed as part of a groundwater interception and floating oil recovery system. Water and oil pumped out of the ground went through oil-water separators where floating oil was skimmed off and stored in larger tanks on the site. Water passing through the separators was pumped into upgradient infiltration galleries where it percolated down into the groundwater. As discussed in the RI, the water pumped to the infiltration galleries contained dissolved phase contaminants.

ARCO and other PRPs have alleged, in ongoing litigation with EPA, that these infiltration galleries caused a spread of contamination at the site and worsened site conditions. ARCO requested that statements to this effect be placed into the RI/FS documents. ARCO also requested other statements be placed in these documents to support their positions against EPA in the litigation. Other comments received during the comment period requested that the infiltration galleries be described as "sources" of site contamination.

Although it is true that groundwater containing dissolved phase contaminants were recycled from the lower portion of the site near Silver Bow Creek to the upper portion of the site, just south of the former process area, MDHES does not consider this activity an addition of contamination at the site. Rather, contamination was removed via NAPL recovery, and soils in the vicinity of the infiltration galleries have not been impacted above soil cleanup criteria. The location of the infiltration galleries is directly upgradient of the heavily contaminated process area. The natural gradient in the area of the infiltration galleries results in flow of groundwater through the process area where the waters become contaminated from contact with LNAPLs and contaminated soils, regardless of whether or not the infiltration gallery is operating. Based on careful evaluation of groundwater quality and flow data, MDHES believes that further conclusions on adverse effects of the infiltration systems are not supported by RI data.

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2.6 Costing Information for FS Alternatives

Several comments were received concerning the costs of the alternatives. ARCO disagreed with excavation unit costs which MDHES required them to use. BN questioned the discount rate used in the calculation of present value of future costs. Comments from the public expressed concern about costs beyond the 30 year time frame used in the FS.

The agencies believe that the estimate of costs for the preferred alternative as presented by ARCO in the feasibility study report significantly overstate certain cost elements. For example, the cost figure of \$17.00 per yd³ for excavation of soils can be expected to apply only to a portion of the most difficult to excavate materials. The costs for most of the excavation should be under \$9.00/yd³. For purposes of comparison of alternatives, however, even the higher figure for this alternative is used. For purposes of budgeting and planning, the agencies' best estimate of the cost of the preferred alternative is \$26.5 million.

It is also recognized that operation and maintenance costs beyond the thirty year time frame used in the FS, and the discount rate used to evaluate the present worth of operation and maintenance costs are important considerations. MDHES recognizes that the use of a seven percent discount rate used in the FS and calculation of present worth costs without inclusion of inflation, tends to underestimate future costs. This also makes the costs of remedies that rely more heavily on future actions such as operations and maintenance for the bulk of site remediation appear less costly than capital intensive remedies.

MDHES firmly believes that, because Alternative 5 removes and treats a large volume of source material while Alternative 3 does not, total remediation time under Alternative 5 is substantially less than under Alternative 3. Therefore, MDHES believes any costs of selected remedy beyond 30 years will be substantially less than the costs of Alternative 3 beyond 30 years. In light of these additional cost considerations, MDHES finds that the costs of the selected remedy compare favorably to the costs of Alternative 3.

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3.0 RESPONSE TO COMMENTS RECEIVED AT THE PUBLIC HEARING

The following are responses to comments received at the public hearing on the Proposed Plan which was held on May 25, 1993. Copies of these comments are provided in Appendix A. Substantive comments are paraphrased here along with MDHES's responses to those comments.

3.1 Comments from Dr. John W. Ray, Montana Environmental Information Center.

Comment 1: Dr. Ray supports the proposed alternative.

Response: MDHES recognizes Dr. Ray's support for the preferred alternative.

Comment 2: Not cleaning up site is contrary to law and would set a bad precedent.

Response: MDHES agrees.

Comment 3: The only alternative which would cleanup the site and provide permanence is the proposed alternative.

Response: MDHES agrees, and has selected a remedy similar to the proposed alternative.

Comment 4: Does not support incineration.

Response: On-site incineration has not been selected as a preferred treatment technology.

Comment 5: Contamination under the highway must be addressed.

Response: The selected remedy calls for excavation and treatment of accessible contaminated soils. Contaminated areas beneath the interstate will still be treated to remove as much contamination as possible. First, soil flushing and enhanced LNAPL extraction will be implemented to remove woodtreating chemicals in this area. Soil flushing must be designed and implemented to ensure that potential structural effects on the highway from these activities are minimized and allowable. Soil flushing will be followed by in-situ bioremediation to treat remaining contamination over the long-term.

Comment 6: Health risk assessment likely underestimates the threat posed by contaminants at the site. Therefore, the site should be cleaned-up to the maximum extent possible.

Response: Although uncertainty exists in the risk assessment process, generally conservative assumptions were made in order to be protective. MDHES has considered these uncertainties in the final remedy selection process.

3.2 Comments from Albert Molignoni, County Water and Sewer District in Rocker.

Comment 1: Mr. Molignoni agrees with Dr. Ray's comments and supports the preferred alternative.

Response: MDHES recognizes Mr. Molignoni's support for the preferred alternative.

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Comment 2: Strict groundwater cleanup criteria must be met.

Response: The actions implemented under the selected remedy will provide source removal to the maximum extent practicable and in-situ treatment of remaining sources to groundwater contamination. In addition, the selected remedy provides for long-term treatment of the groundwater to further reduce contamination and requires compliance with groundwater standards at locations which will ensure the protection of the aquifer and Silver Bow Creek. These actions will allow the best chance of groundwater remediation over the long term.

Comment 3: Although the well ban prohibits domestic use of groundwater, it allows other uses such as lawn and garden watering. What about some small child drinking that water that is contaminated out of a garden hose?

Response: Under the selected remedy, institutional controls will be put in place to prohibit all uses of contaminated groundwater which would result in an unacceptable risk from exposure. These prohibitions will remain in place in perpetuity.

3.3 Comments from Sandy Stash, ARCO

Comment 1: ARCO agrees with the State on portions of the selected remedy including remedy for stored soils, oils and sludges.

Response: MDHES recognizes points of agreement.

Comment 2: The State has overestimated the effectiveness of proposed remedy. You can't get 90 percent of the contamination. We feel you would be extremely lucky to get 50 percent.

Response: ARCO and ARCO's contractor provided the FS estimate of 80 to 90 percent removal under Alternative 5B. MDHES agrees with this estimate. ARCO has provided no technical information to support their lower numbers. Also see Section 2.4 and responses to comments 6 and 7 in Section 5.2.1. Therefore, excavation to the extent practicable, followed by in-situ treatment, is a workable and effective remediation technique.

Comment 3: Cannot reach groundwater cleanup goals under any of the alternatives.

Response: MDHES recognizes uncertainty and difficulty of reaching groundwater cleanup goal (MCLs) throughout the entire site. However, the nature of contamination at Montana Pole, specifically the near surface (within about 15 feet) proximity of the vast majority of the contaminated source material, the accessibility of this material and the absence of sinking product (DNAPLs) at the site, lend the site to being a good candidate for effective remediation. Although reaching MCLs cannot be guaranteed throughout the entire site, MCLs are achievable at the points of compliance and the selected remedy will provide the maximum amount of source reduction practicable.

Comment 4: Excavation will emulsify oil and could actually make things worse by driving

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contamination into the groundwater. Might actually spread the source. Going to have more contaminated groundwater than we have right now.

Response: MDHES disagrees. Data from the RI show groundwater in contact with floating oil is currently saturated with PCP. This groundwater cannot pick up more contamination during excavation. Photographs and reports from previous excavations at the site do not indicate that emulsification was a problem. Although ARCO has submitted no technical information or case studies to back up their claims about emulsification, they have suggested that in-situ treatment of materials at and below the groundwater table may be more practical than excavation. The agencies have considered this information and this type of approach is allowed under the ROD. Also see Section 2.4.

Comment 5: Supports Alternative 3 (capping and long-term containment). Alternative 3 is a better remedy; would require less time, can be done in conjunction with LAO.

Response: MDHES recognizes ARCO's preference for Alternative 3 and that implementation of Alternative 3 would require less time than implementation of Alternative 5B. However, Alternative 3 requires perpetual operations and maintenance. The selected remedy can also be done in conjunction with LAO cleanup.

Comment 6: Concerned that the Feasibility Study Report, as changed by MDHES, misses some of the points as to the effectiveness and implementability of the remedy.

Response: MDHES disagrees. See Section 2.4.

Comment 7: Alternative 3 is as protective of human health and the environment as Alternative 5.

Response: MDHES disagrees. MDHES maintains that treatment of contaminants is more protective than long-term containment of contaminants. Also see response to Comment 5 in Section 5.2.1.

Comment 8: A cap may be required under Alternative 5 if cleanup goals are not met.

Response: A cap was included as a contingency for Alternative 5 if soil treatment did not meet health based cleanup goals. However, allowable health-based cleanup goals are achievable and expected. Achieving these health based levels has been demonstrated at other sites such as the Libby site and have been shown to be achievable by the Montana Pole treatability studies. Therefore, a cap is not anticipated to be required under the selected alternative. Also see response to comment 2 in Section 5.1.5.

Comment 9: Short term risks of Alternative 5 may not be worth the limited protection provided by treating the soils.

Response: Short term risks, as described in the feasibility study, will be present when cleaning up the site. But MDHES considers these risks manageable and no different than risks at other similar sites. MDHES believes that site access control and health and safety measures will provide adequate protection for workers and residents.

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Comment 10: Both Alternative 3 and Alternative 5 meet ARARs except for the chemical specific ARAR for groundwater. PCP concentrations in groundwater would likely be greater than the MCL, indefinitely under both alternatives.

Response: MDHES agrees that groundwater MCLs will not be met under Alternative 3. See response to Comment 3 in this section.

Comment 11: Cannot likely meet 3 mg/kg PCP in soil.

Response: The soil remediation level in the Proposed Plan was 8.2 mg/kg. This is near what is technically possible to achieve with bioremediation. MDHES has modified the soil cleanup level to 34 mg/kg. This level has been demonstrated achievable at other sites and will provide adequate protection for human health under the anticipated land uses.

Comment 12: Excavation below water may increase the mass of dissolved contamination and could emulsify the oil and water which would make it more difficult to treat and extend time required to treat groundwater.

Response: MDHES disagrees. See response to Comment 4 in this section.

Comment 13: Soils beneath the interstate would require long-term in-place treatment.

Response: MDHES agrees and long-term treatment of soils beneath the interstate is part of the selected remedy.

Comment 14: Even though excavation under Alternative 5 may remove 85 percent of LNAPL and 80 percent of soils, groundwater PCP concentrations would be greater than MCLs.

Response: MDHES recognizes the difficulty and uncertainty of reaching MCLs in the groundwater. See response to Comment 3 in this section.

Comment 15: Treated soils may become recontaminated when backfilled.

Response: MDHES recognizes the impracticality of attempting to remove 100 percent of soil contamination at the groundwater table. However, MDHES believes that the majority of this highly contaminated material can be readily removed. Some residual contamination will remain in place which could recontaminate backfilled treated soils, however, the treated soils will already contain low levels of contamination and the impact is not expected to be substantial. In-situ bioremediation will be used to treat residual contamination in backfilled, treated soils, to treat residual contamination not recovered during excavation and to treat on-site contaminated groundwater.

Comment 16: Volume of contaminated soil may increase because there is a high potential for contamination to spread.

Response: ARCO has submitted no technical data to substantiate this claim. Photographs and reports from previous excavations at the site do not support this claim.

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Comment 17: Significant short term risks associated with Alternative 5 due to volume of soils to be handled, required duration of dewatering and treating these materials, "lake" and LNAPL present on open water would present a significant risk.

Response: MDHES believes risks during cleanup can be properly managed. Also see response to Comment 9 in this section.

Comment 18: Excavation below the water table is more difficult than excavating above the water table.

Response: MDHES agrees. Also see Section 2.4.

Comment 19: Additional full scale demonstration study will be required on soil treatment during remedial design.

Response: MDHES also believes that may be necessary and can be performed as part of remedial design.

Comment 20: Preferred remedy costs do not include soil flushing system beneath highway.

Response: As soil flushing was described as a integral part of Alternative 5 in the FS, ARCO should have properly accounted for these costs. ARCO has provided additional cost information to MDHES since completion of the FS. The soil flushing costs do not significantly alter the total cost of the remedy and have been accounted for in the Record of Decision.

Comment 21: Experience shows that actual soil volumes can be 50 to 100 percent higher than anticipated.

Response: Conservative assumptions and methodology were used when calculating soil volumes, however, MDHES acknowledges uncertainties.

Comment 22: Excavation costs may be considerably higher than estimated due to implementability problems.

Response: MDHES feels confident that excavation costs are within the range of accuracy necessary for the feasibility study. Also see Section 2.6.

[The following comments are from written materials submitted by ARCO at the public hearing entitled "ARCO's Position on the Montana Pole Plan Cleanup Proposal."]

Comment 23: Agree with 1) preventing contaminated groundwater from entering Silver Bow Creek and containing the site groundwater into the foreseeable future; 2) remove and treat oils, sludges, equipment and debris; 3) Biotreat soils in barns; 4) excavate and treat isolated soils areas; and 5) institute controls to prohibit groundwater use.

Response: MDHES recognizes points of agreement.

Comment 24: ARCO disagrees with excavation of source areas near groundwater.

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Response: MDHES believes that excavation near the groundwater table, demonstrated to be implementable previously at and near the site, will be effective at removing the bulk of the heavily contaminated source material located there. Also see Section 2.4.

Comment 25: Some sources will not be possible to remove. There is no technology available that can effectively remove oily contaminants under these conditions.

Response: Excavation cannot be expected to remove 100 percent of the material. Inaccessible areas beneath the highway will be addressed by soil flushing and other appropriate LNAPL recovery techniques. Reports and photos from EPA removal actions at the site are evidence that excavation is feasible and excavation in combination with recovery of floating product from the open excavation can be effective. ARCO has submitted no technical information to substantiate their claim. Also see Section 2.4.

Comment 26: The contamination may spread if cleanup by excavation is attempted.

Response: MDHES disagrees, but recognizes the problems which may be encountered. See Comments 4, 12, and 16 in this section and Section 2.4.

Comment 27: ARCO favors Alternative 3.

Response: MDHES recognizes ARCO's preference for Alternative 3, but notes that ARCO and other PRPs proposed another alternative (see Section 6.4) which has been considered by the agencies.

Comment 28: A cap (under Alternative 3) will provide adequate barrier to exposure.

Response: A cap provides adequate protection from exposure to contamination if properly maintained in perpetuity. A cap does not address continued dissolution of contaminants from LNAPLs into groundwater.

Comment 29: ARCO proposes that the ultimate land use be as a park.

Response: MDHES recognizes that under Alternative 3, ultimate land use as a park or other recreational area may be appropriate. Park development would also be compatible with the selected remedy.

Comment 30: ARCO believes the MDHES plan would spend millions more and get to the same end point with no additional benefit.

Response: MDHES believes that the benefits of 1) reduction of volume and toxicity of contamination, 2) a more permanent remedy than capping, 3) reduced future threats to Silver Bow Creek by removal of source area, and 4) providing the best opportunity for eventual discontinuation of long-term operation and maintenance activities at the site, are substantial and can be achieved with the selected remedy.

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3.4 Comments from Mike Fitzgerald and Jon Sesso, Butte-Silver Bow County Government

[Mike Fitzgerald comments]

Comment 1: Alternatives 1 and 2 are not acceptable.

Response: MDHES agrees.

Comment 2: Alternatives 3, 4 or 5 could be utilized if correctly implemented.

Response: MDHES believes that the selected remedy best satisfies the requirements under the nine evaluation criteria.

Comment 3: On-site oils, sludges, near-stream soils, previously bagged soils and surface hot spots need to be addressed.

Response: This contamination is addressed under the selected alternative.

Comment 4: Need for extensive and possibly permanent groundwater containment, reduction and monitoring program.

Response: This is provided for under the selected alternative.

Comment 5: Does not support incineration.

Response: On-site incineration is not part of the selected alternative.

Comment 6: A combination of soil remediation technologies may be appropriate.

Response: MDHES agrees and has adopted a remedy which combines excavation, above-ground treatment, in-situ treatment and containment.

Comment 7: Concerned with logistics and effectiveness of product removal in and around the groundwater table.

Response: MDHES believes that source material near the groundwater table can be effectively removed. For material which cannot be removed, in-situ treatment will be utilized. See response Section 2.4.

Comment 8: Must consider the amount of source control needed for each remediation alternative and the percent of contamination remaining post remediation.

Response: These issues have been considered throughout the decision making process.

[Comments from Jon Sesso]

Comment 9: Butte-Silver Bow cannot take a firm position on any of the alternatives as making a choice is tantamount to taking sides and confrontation is not the answer.

Response: MDHES agrees that confrontation burdens the process.

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Comment 10: Should concentrate on points of agreement.

Response: MDHES recognizes points of agreement with ARCO.

Comment 11: Should get started immediately on those items that we have consensus and agreement on.

Response: MDHES believes that portions of the site remedy, such as off-site treatment and disposal of oils, sludges, equipment and debris, require minimal design considerations and may be expedited.

Comment 12: Perhaps defer the final decisions on the contentious issues until better information is available.

Response: The agencies believe that a decision on entire site cleanup can and should be made at this time.

Comment 13: Six points:

- 1) Support the solution that results in timely implementation
- 2) Support bioremediation
- 3) Support the solution which is most practical. Support the solution which relies on the best scientific advice and information and removes the maximum amount of pollution from the area.
- 4) Support the solution that assures the site can be remediated in synch with LAO.
- 5) Support the solution that supports acceptable land use in the long-term. The remedy will be intolerable if the area and land cannot be used by present and future residents for some worthy purpose. If there are any advantages to changing existing zoning ordinances and land-use policies, BSB is willing to consider such changes.
- 6) Support the solution which has the support of the local citizens.

Response: Specific responses to these comments are provided in Section 5.4.

3.4 Comments from Mary Kay Craig, Clark Fork-Pend Oreille Coalition.

Comment 1: Supports the proposed remedy, Alternative 5B.

Response: MDHES recognizes Ms. Craig's support for the preferred alternative.

Comment 2: Must do everything to meet MCLs in groundwater.

Response: The selected alternative provides source removal to the maximum extent practicable followed by in-situ treatment of remaining contamination. The selected alternative also provides the best chance of all the alternatives of remediating site groundwater and attaining MCLs at appropriate points of compliance.

Comment 3: Remedy must be permanent as required by law.

Response: MDHES believes that the selected alternative provides the highest degree of

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permanence of all the alternatives.

Comment 4: ARCO's preferred remedy, Alternative 3B, is not a permanent remedy.

Response: MDHES does not believe that Alternative 3B provides the degree of permanence that the selected remedy does.

Comment 5: If ARCO is allowed to escape the required water quality standards here, it will be easier for them to argue for lower standards throughout the Clark Fork Basin.

Response: The agencies feel that remedies for each site within the Clark Fork Basin will carefully and fully considered.

Comment 6: State should give as much consideration to "permanence" as to "cost".

Response: The agencies believe that we have considered these two criteria appropriately in the decision making process.

3.6 Comments from Mel Rowling, President, Citizens Environmental Technical Committee (CTEC)

Comment 1: Concerned about the amount of dissolved PCP moving past EPA's intercepting wall. Has PCP loading to the creek increased since the wall was installed?

Response: ARCO has declined to provide data to MDHES citing their litigation concerns. EPA has provided some data which show that creek levels appear to be about the same as when sampled during the RI, however, the intercepting wall has only been in place since September 1992. The soils between the Gundwall and the creek are saturated with contamination and it will be easier to determine if LNAPL is moving through or under the Gundwall after the creek soils are removed.

Comment 2: The agency needs to quantify continued contaminant loading of the stream over the projected life of the project under each alternative to compare how well groundwater/surface water quality goals can be met under the different alternatives.

Response: This type of modeling would require extensive new studies, modeling and perhaps data gathering to obtain a more definitive answer. MDHES feel that the remedial action decision is based on an appropriate level of data and analysis.

Comment 3: Remedy chosen must be consistent with the goals and objectives set both for this site and downstream.

Response: MDHES believes that the goals and objectives of the selected alternative are consistent with other sites in the region.

Comment 4: Final decision must reflect currently known land-use goals and not a standard of cleanup that far exceeds what is needed for the anticipated use of the site.

Response: Cleanup levels and goals will reflect the anticipated future land use of the site.

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Also see Section 2.1.

Comment 5: Concerned that even the most aggressive remedy would leave contamination bound in the soil below the smear zone.

Response: Some residual contamination in soils below the smear zone and dissolved in groundwater would remain after excavation. This contamination would be treated by in-situ bioremediation.

Comment 6: Concerned about the permanence of the remedy.

Response: MDHES believes that the selected alternative provides the highest degree of permanence of all the alternatives.

Comment 7: If a more aggressive and expensive treating plan is chosen, expect relatively complete cleanup and bringing the site back into productive use for the community.

Response: The agencies believe that site remediation under the selected alternative, although more expensive than some of the other alternatives, will accomplish other important goals in addition to allowing productive use of the area for the community. Other benefits include 1) maximum reduction of volume and toxicity of contamination, 2) highest degree of permanence, 3) minimizing future threats to Silver Bow Creek by removal and treatment of source area, and 4) providing the best opportunity for eventual discontinuation of long-term operation and maintenance activities at the site.

3.7 Comments from Theresa Craig, Butte Resident Who Lives Nearby.

Comment 1: Wants the best possible cleanup.

Response: MDHES believes that the selected alternative does provide the best practical cleanup at the site.

3.8 Comments from Jim Riley, Butte Resident and Former Employee of the Montana Pole and Treating Company.

Comment 1: Should consider the health of the former workers.

Response: Superfund does not address these questions. MDHES has referred Mr. Riley's questions to the state Occupational Health Bureau and the federal Agency for Toxic Substances and Disease Registry (ATSDR).

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4.0 RESPONSE TO ORAL COMMENTS RECEIVED DURING THE COMMENT PERIOD

The following are responses to oral comments received at MDHES's offices during the public comment period on the Proposed Plan which ran from May 7, 1993 through July 7, 1993. Copies of the transcript of these comments are provided in Appendix B. Substantive comments are paraphrased here along with MDHES's responses to those comments.

4.1 Comments from Nicki Leiss, a Resident of Anaconda.

Comment 1: Excavation below the groundwater table cannot be done. There is no technology for this.

Response: MDHES believes that source material found at or near the groundwater table can be effectively excavated with standard excavation equipment. This has been demonstrated previously at and near the site. Contamination which cannot be excavated will be addressed by in-situ bioremediation. See Section 2.4.

Comment 2: The site should be reseeded with grass, shrubbery and flowers.

Response: Regrading and vegetating the site is part of the selected remedy.

4.2 Comments from Wanda Johnson, a Resident of Butte.

Comment 1: Full cleanup of the site now is preferred rather than leaving things for long-term cleanup.

Response: The selected alternative provides the maximum amount of cleanup in the short-term in order to minimize the need for long-term operations and maintenance at the site.

4.3 Comments from Don Stoeker, Clark Fork Pend Oreille Coalition and Audubon Society

Comment 1: Should excavate the area and leave it open for a time so that it can flush out. Would flush out better if not immediately filled in with treated soils.

Response: Details of excavation at the site will be determined more precisely during the design process. However, it is recognized that there are advantages to leaving the excavations open. This would allow access to and collection of floating product. Would also allow exposure to the sun which can increase degradation of contaminants.

Comment 2: Soils under the interstate should be completely removed. Soil flushing does not sound effective enough.

Response: Unless the interstate highway overpass were to be relocated, the only option available for addressing the contamination in this area is soil flushing, other appropriate LNAPL recovery techniques and in situ bioremediation, as proposed. MDHES believes

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these methods will be effective in addressing the contamination beneath the highway.

Comment 3: Concerned about the length of time it will take to cleanup the site.

Response: The agencies recognize that it will take a substantial amount of time to cleanup the site due to the high volumes of contaminants present. However, the agencies will do everything within our means to speed the process along.

4.4 Comments from an Anonymous Caller

Comment 1: Should put the creek in a pipe to divert it around the area and let nature do the rest. We shouldn't dig it up.

Response: The agencies believe that contamination at the site must be addressed. Simply diverting the creek, while perhaps addressing short-term impacts to the creek, does not address the long-term impacts of site contamination. MDHES believes that the selected remedy provides the best practical cleanup of the site.

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5.0 RESPONSE TO WRITTEN COMMENTS RECEIVED DURING THE COMMENT PERIOD

The following are responses to written comments received at MDHES's offices during the public comment period on the Proposed Plan which ran from May 7, 1993 through July 7, 1993. Copies of these comments are provided in Appendix C. Substantive comments are paraphrased here along with MDHES's responses to those comments.

5.1 Comments from Burlington Northern Railroad (BN).

5.1.1 Comments from Transmittal Letter

Comment 1: First bullet item. BN found numerous discrepancies in the RI and FS reports, particularly between tables, figures and the final data tables, Appendix L of the RI.

Response: MDHES is confident in the accuracy and reliability of the final data summary reports and final data tables (Appendix L of the RI). The decision for the site is based upon this data. Discrepancies in the RI and FS reports have been thoroughly reviewed by MDHES and are not considered by MDHES to have any significant effect on the overall conclusions of the RI, BRA, FS or the Proposed Plan. However, ARCO is being requested to make the appropriate changes to the documents for Administrative Record purposes. Also see Section 2.3.

Comment 2: Second bullet item. Evidence clearly identifies the infiltration galleries as a source of contamination and as contributing to the problems to be eventually remediated.

Response: MDHES considered the description of the infiltration galleries to be factual. Based on careful evaluation of groundwater quality and flow data, MDHES believes that further conclusions on adverse effects of the infiltration systems are not supported by the data. Also see Section 2.5.

Comment 3: Third bullet item. It is an unjustifiable assumption that the site could be used for residential purposes.

Response: MDHES believes that our considerations of land use at the site are justifiable and were necessary in order to provide the full range of potential risks to the regulatory decision makers. Also see Sections 2.1 and 2.2.

Comment 4: RI pages 1-4, 1-23 and 5-2 and Figures 1-3 and 1-5. BN points out that the RI's description of the "treatment pond", "wastewater ditch", "sedimentation pond" and other historical site features are not clear as to location or function as sources.

Response: The historical description of the site in the RI may be incomplete in some respects. However, the nature and extent of the contamination rather than how the site was contaminated is the focus of the RI. MDHES recognizes that detailed information on how the site was contaminated and when that contamination occurred may have legal implications

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for certain parties. These questions are being addressed by those other parties, outside of the RI/FS process. Also see Section 2.3.

Comment 5: RI pages 3-22 thru 3-23. Evidence of the southeast infiltration gallery as a source is indicated by Figures 4-12 and 4-22 which show the groundwater contamination plume further upgradient than the LNAPL plume.

Response: See Section 2.5.

Comment 6: RI page 1-3. Site contamination is located beyond the approximate boundaries described in the report, particularly related to the site's western boundary.

Response: As defined in the NCP, 40 CFR § 300.5, and as provided for in the Administrative Order on Consent for the RI/FS at the site, site boundaries at the Montana Pole and Treating Plant site include all areas where site related contamination is present.

Comment 7: RI Figure 4-12. BN questions the PCP concentration in well GW-13.

Response: Appendix L, the final data summary tables, contains a typographical error. Figure 4-12 correctly represents the sampling results from GW-13.

Comment 8: The RI and FS do not address all site contamination since they do not consider the southeast infiltration gallery a source of contamination.

Response: The RI and FS do address all site contamination, as known from the RI data. The issue of actually characterizing the infiltration gallery as a source of contamination is a different issue altogether than the issue of characterizing nature and extent of contamination. See Section 2.5.

Comment 9: BN questions the difference in delineation of the LNAPL plume in Figure 3-3 of the FS as compared to Figure 3-15 of the RI.

Response: MDHES believes that the Figure 3-3 in the FS is more accurate than Figure 3-15 in the RI. The field notes in RI Appendix F (10/25/90) for GW-16, which is just north and east of W-3, note the presence of product at this location. Additionally, product was found on the northeast side of the site to the railroad track to the east of W-3 during EPA's 1992 trenching activities. The western boundary of the LNAPL plume as shown on Figure 3-3 is MDHES's interpretation based on interpolation of data from well W-8 to the downstream seep on Silver Bow Creek, and additional information gathered during EPA's 1992 trenching activities.

5.1.2 Comments on Remedial Investigation Report

Comment 1: Major Comment 1. BN identifies numerous data inconsistencies and transcription errors in the RI report.

Response: MDHES is confident in the accuracy and reliability of the final data summary reports and final data tables (Appendix L of the RI). The decision for the site is based upon

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these data. Discrepancies in the RI and FS reports have been thoroughly reviewed by MDHES and are not considered by MDHES to have any significant effect on the overall conclusions of the RI, BRA, FS or the Proposed Plan. Also see Section 2.3.

Comment 2: Major comment 2. Concentrations below detection limits should not have been considered zero for calculation purposes.

Response: MDHES agrees with the comment. However, the risk assessment does consider concentrations below detection limits to equal one-half the detection limit. Additionally, MDHES focuses on PCP concentrations as the most reliable indicator compound for delineation of extent of contamination at the site. Thus this discrepancy is not considered to have any significant effect on the overall conclusions of the RI, BRA, FS or the Proposed Plan.

Comment 3: Major comment 3. Solubility is highly dependent on pH which varies significantly across the site.

Response: MDHES recognizes that pH variation across the site will effect PCP solubility and partitioning coefficient, thereby influencing concentrations of dissolved contaminants in the groundwater and fate and transport rates. However, the determination of nature and extent of contamination is based on actual analytical measurements of PCP concentrations in the groundwater. Variation of contaminant solubilities across the site may be worth considering during the Remedial Design (RD) and Remedial Action (RA) phases of the project, but MDHES does not consider such detailed theoretical analysis to be necessary during the RI and FS phases of the project, when actual concentration data are available.

Comment 4: Major comment 4. BN identifies inconsistencies with regard to floating product (LNAPL) measurements in monitoring wells.

Response: The estimated extent of the LNAPL plume is based on a significant amount of data from a large number of wells and is considered by MDHES to be accurate to the degree necessary for appropriate RI, FS and RD considerations. During the Remedial Design (RD) and Remedial Action (RA) phases of the project, more detailed information on the characteristics of the LNAPL plume will be obtained which may result in fine tuning of the specific RA approach.

Comment 5: Major comment 5. BN questions the method used to analyze slug test data.

Response: Slug test data analysis was based on unconfined aquifer conditions not confined aquifer conditions. The Bower and Rice method is an accepted method of analysis commonly used in the industry. Additionally, pumping test data were also used in the calculation of hydraulic conductivity at the site. MDHES considers the hydrogeologic information presented in the RI to be sufficient for RI and FS considerations. Further studies might be conducted during the RD phase of the project. Adjustments to the groundwater control and recovery systems are also expected based on more detailed information gathered during the RA.

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Comment 6: Major comment 6. The amount of sample volume does not appear to be sufficient for Quality Assurance/Quality Control (QA/QC) analyses.

Response: The QA/QC data are presented in the final data summary reports which indicates that enough volume was collected to conduct QA/QC analyses.

Comment 7: Specific comment on RI Section 1.2.3. This comment addresses a specific discrepancy in RI data regarding the volume of oil recovered from the recovery trenches. Additionally a table reference correction is suggested.

Response: Comments are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

Other BN comments regarding specific discrepancies in the RI which MDHES does not consider to have overall impacts to the RI, BRA, FS or Proposed Plan include comments on: Sections 2.2.4, 2.2.6.1, 4.1.1.1, 4.1.1.2, 4.1.1.7, 4.1.2.6, 4.2.1.5, 4.2.2, 4.2.2.1, 4.2.2.2, 4.2.2.4, 4.3.2, 4.3.3.1, 4.3.4, 4.3.8.2, 4.3.8.6, 4.4.2, 4.4.4, 4.4.6, 5.2.1.1, 6.3.1; Tables 2-11, 2-16, 2-23, 3-7, 4-2, 4-4, 4-12, 5-2; Figures 2-7, 2-13, 3-15, 4-1, 4-3, 4-4, 4-5, 4-6, 4-9, 4-10, 4-11, 4-13, 4-14, 4-17, 4-20, 4-27, 4-36, 4-37; and Appendix A.

The information requested in the comment to Paragraph 5 is provided in Appendix N of the RI and in the referenced document: "Final Draft Work Plan for the Montana Pole NPL Site", Volume I (Camp Dresser & McKee, Inc. 1989).

Comment 8: Section 1.2.4. Data inconsistencies and questions on volume estimates.

Response: Comments on data inconsistencies are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. The volume estimates presented in this Section are based on Previous Investigations. Revised volume estimates based on the RI field work are provided in the FS.

Comment 9: Section 2.2.4.1. Item 3 - Were samples collected at 0-0.5' and 0-1' used to characterize surface soils? Data inconsistencies also noted for paragraph 2.

Response: Item 3. Samples collected at 0-0.5' and 0-1' were used to characterize surface soils.

Comments to Paragraph 2 are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

Comment 10: Section 2.2.10. Were sewer line samples wastewater samples?

Response: The samples were wastewater samples.

Comment 11: Section 3.6.2.1. Paragraph 6 data inconsistencies. Paragraph 10 - The accuracy of slug test results is questioned.

Response: Paragraph 6. Comment is noted, but is not considered to effect the overall

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conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

Paragraph 10. See Response to Comment 5 in this section.

Comment 12: Section 3.6.2.3. BN questions section references in Paragraph 2. Data discrepancies are noted in paragraph 3. The extent of LNAPL plume is also questioned in paragraph 4.

Response: Paragraph 2. Section 2.3.3 should be replaced with Section 2.2.3. The reference to Table 3-3 should also reference Table 3-8.

Paragraph 3. Comments are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

Paragraph 4. Comment is noted, but is not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Response to Comment 4 in this section.

Comment 13: Section 4.0. BN notes data discrepancies in paragraph 2. BN questions concentrations below detection limits being considered equal to zero in paragraph 6.

Response: Paragraph 2. Comments are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

Paragraph 6. See response to Comment 2 in this section.

Comment 14: Section 4.1.1.4. BN notes that a table of TCLP regulatory limits is not provided for organic constituents.

Response: This table should have been provided. MDHES is considering all TCLP regulatory limits under the ROD.

Comment 15: Section 4.2.1.1. BN notes data discrepancies and questions whether hydrocarbons means TPH or PAHs.

Response: Comment on data discrepancies is noted, but is not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

Reference to hydrocarbons is for TPH, not PAHs.

Comment 16: Section 4.2.1.2. BN questions figure references in paragraph 1 and notes data discrepancies in paragraph 3.

Response: Reference to Figures 4-1A and 4-1B in paragraph 1 should be changed to 4-3 through 4-5.

Comments to Paragraph 3 are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

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Comment 17: Section 4.2.1.3. BN notes data discrepancies and questions whether hydrocarbons means TPH or PAHs in paragraph 1. The term "majority of hydrocarbons" is ambiguous in paragraph 2.

Response: Paragraph 1. Comment is noted, but is not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3. Reference to hydrocarbons is for TPH, not PAHs.

Paragraph 2. The term "majority" is used as reference to the other TPH constituents besides Fuel Oil # 4 which are analyzed using Method NYS 310.3 (Fuel Oil #s 2 and 6, and Kerosene).

Comment 18: Section 4.2.1.4. BN notes data discrepancies and questions whether hydrocarbons means TPH or PAHs in paragraph 1. BN requests statistical summary of PCP results in paragraph 3. BN questions conclusions in paragraph 5 regarding level of contamination in treated wood drippage area.

Response: Paragraph 1. Comments are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3. Reference to hydrocarbons is for TPH, not PAHs.

Paragraphs 3 and 5. MDHES does not see the need for the requested statistical summary of PCP results. MDHES disagrees that there is insufficient data provided to substantiate the conclusions in paragraph 5. The data clearly support the conclusion that the treated wood drippage area contributed significantly less contamination to the site than did the process area and waste discharge drainage ditch.

Comment 19: Section 4.2.4. BN notes data discrepancies in paragraph 1, 2 and 3 regarding metals concentrations.

Response: Comments are noted, but do not effect the overall RI conclusion that elevated concentrations of metals at the site, above naturally occurring background levels, are considered to be related to historic mining operations in the vicinity of the site, rather than MPTP related activities. The presence of metals at the site is addressed in the FS and Proposed Plan. Also see Section 2.3.

Comment 20: Section 4.3.8.1. BN questions arsenic concentrations in groundwater.

Response: See response to Comment 19 in this section.

Comment 21: Section 4.4.7. BN notes potential preferential flow conduit along sewer line.

Response: Any preferential flow along the sewer line will be addressed by groundwater containment systems which are an integral part of the proposed remedy.

Comment 22: Section 5.1.1.1. BN questions locations of historic spills.

Response: See response to Comment 4 in Section 5.1.1.

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Comment 23: Section 5.3.1. BN questions notations in hydrogeologic equation in paragraph 1 and provides alternate notations. Data discrepancies are noted in paragraphs 4 and 5.

Response: Paragraph 1. Although the notations are slightly different, the equation is the same.

Paragraphs 4 and 5. Comments are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

Comment 24: Section 5.3.2. BN questions notations in hydrogeologic equation in paragraph 2. BN notes variation of PCP solubility with pH in paragraph 8. BN notes data discrepancies in paragraph 10 and 11.

Response: Paragraph 1. Although equation is presented incorrectly in the text, it is applied correctly in table 5-2.

Paragraph 8. See Response to Comment 3 in this section.

Paragraphs 10 and 11. Comments are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

Comment 25: Section 6.3.2. BN notes PCP solubility variation with pH.

Response: See response to Comment 3 in this section.

Comment 26: Table 2-3. BN questions whether amount of sample collected was enough to fulfill QA/QC requirements.

Response: See response to Comment 6 in this section.

Comment 27: Table 2-13. Why were both method 8280 and 8290 used for dioxin analyses?

Response: Method 8290 was used in Round 3 sampling to obtain lower detection limits than provided by Method 8280. This was done to obtain low detection limits for groundwater samples, but was also used for the soil sample collected during this round to avoid having to specify two different dioxin methods for Round 3 sampling.

Comment 28: Table 2-14. BN requested citing of the CLP statement of work used.

Response: Organics were analyzed using EPA Organic CLP SOW 1/87. Inorganics were analyzed using EPA Inorganic CLP SOW 3/90.

Comment 29: Table 3-5. Unclear as to reference of well 2-16.

Response: The reference should have been to Well W-16.

Comment 30: Table 3-8. Unclear as to reference of well R-4.

Response: Wells R-1, R-2, R-3 and R-4 are the recovery trench wells.

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Comment 31: Table 4-3. Regulatory criteria should be cited.

Response: The numbers cited are the regulatory criteria. (March 29, 1990 Federal Register as amended in the June 29 Federal Register)

Comment 32: Table 4-10. BN raises a concern regarding the reporting of surface and subsurface soil contaminant concentrations. How were BTEX totals calculated? BN recommends depth dependant statistical analysis.

Response: The maximum PCP concentration reported is from a soil boring at a depth of 0-2'. This sample is provided as a subsurface sample because it was collected from a soil boring, but it is also used for surface soil data since it was collected from a shallow interval. The maximum TPH concentration is in error. The actual maximum subsurface soil concentration detected was 21,900 mg/kg at SL-207 (see Figure 4-5).

Regarding the method used for calculation of BTEX based on analytical data, ARCO has been asked to address this question in the revised RI document which will be provided as per Section 2.3.

A depth dependent statistical summary is not necessary to observe the clear occurrence of significant reduction in concentrations with depth as described in the text and presented in site figures.

Other comments provided on Table 4-10 are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

Comment 33: Table 4-13. BN notes that sampling results from some "off-site" wells are not included. BN also notes general discrepancies related to the table.

Response: Concentrations are in ug/l unless otherwise noted. The data for wells GS-18, GS-22, GS-25 and BMW-9A are found in the figures and in Appendix L. All other comments on this table are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

Comment 34: Figure 1-9. Incorrect scale indicated.

Response: There is no Figure 1-9.

Comment 35: Figure 2-11. BN questions difference between "monitoring well/boring location" and "monitoring well/subsurface boring location".

Response: There is no difference. This figure should not have differentiated between the two.

Comment 36: Figure 4-7. BN questions how BTEX concentrations were calculated and identifies data discrepancies.

Response: Regarding calculation of BTEX concentrations, see response to Comment 32 in

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this section. Other comments are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

5.1.3 Comments on Final Baseline Risk Assessment and Revised Baseline Risk Assessment

Comment 1: General comment 1. BN questions the assessment of risks associated with inorganics and recommends consideration of background concentrations for PAHs and dioxins/furans.

Response: The comment recognizes the need for coordination of cleanup activities among Butte-area sites. On this basis, it is difficult to understand an objection to inclusion in the risk assessment of information explicitly intended to assist risk managers with such coordination. Moreover, the EPA's Risk Assessment Guidance for Superfund (EPA 1989), and other guidance documents, provide extensive instruction on consideration of background concentrations of compounds, both anthropogenic and naturally occurring. The guidance indicates that it is not "...inappropriate to quantify risk, which will be considered in risk management decisions, using contaminants that are not associated with site activities." The guidance is clear that anthropogenic chemicals, such as those in question at the Montana Pole site, should not be eliminated "...since it is difficult to conclusively show...that such chemicals are present at the site due to operations not related to the site or the surrounding area." The guidance also states that omitting anthropogenic background chemicals from the risk assessment could result in the loss of important information for those potentially exposed. For these reasons, arsenic was carried through the risk assessment process. However, the risk assessment notes, in *numerous* places, that the risks associated with exposure to inorganic chemicals are not believed to be related to the Montana Pole Site.

Background levels for PAHs and dioxins/furans were below detection limits in background soil samples. Background concentrations of organics including PAHs in Silver Bow Creek have been considered by regulatory decision makers and will be reflected in regulatory decisions.

Comment 2: General comment 2. BN does states that it is unreasonable to consider future residential land use or future installation of drinking water wells.

Response: MDHES considers it reasonable to assess risks based on current and future residential land use and future installation of drinking water wells since current zoning and well restrictions are not prohibitive of these activities. Also see Section 2.1.

Comment 3: General comment 3. BN questions the use of screening quality data in the risk assessment and questions the potential effect of RI data discrepancies on risk assessment findings.

Response: Most data for the major site related COCs contain a large proportion of enforcement quality data. Estimates for exposures to PCP and dioxins/furans especially are

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not likely to be greatly influenced by uncertainties in screening quality data. Although a relatively high proportion of PAH data was screening quality, PAHs are relatively minor contributors to overall site related risks. The effect of data problems for PAHs on the results of the risk assessment is considered small.

The final data summary reports, not RI report data tables or figures, were used as the data base for performing the risk assessment. MDHES considers the final data summary reports to be accurate and reliable for risk assessment purposes.

Comment 4: General comment 4. BN questions dermal exposure assessment approach in the risk assessment.

Response: The EPA guidance document "Dermal Exposure Assessment: Principles and Applications" (EPA 1992) was not cited in the text but, as noted in the comment, the guidance offers little information concerning dermal uptake from soil. Several sources were searched to determine chemical-specific data on the potential for dermal exposure from the chemicals of concern. These sources included chemical-specific EPA guidance and authoritative reviews such as those prepared by the Agency for Toxic Substances and Disease Registry (ATSDR). The RA was reviewed by EPA - Region VIII. EPA did not disagree with the dermal exposure assessment in the RA.

Comment 5: General comment 5. BN questions why benzo(ghi)perylene was evaluated as a carcinogen.

Response: While it is true that benzo(ghi)perylene is a Group D carcinogen, the EPA's Toxics Integration Branch has assigned a Toxicity Equivalency Factor (TEF) of 0.01 to this compound (EPA 1989), which indicates that it should be considered to be one hundredth as carcinogenic as benzo(a)pyrene. This method was used as guidance prior to receiving Agency wide approval. The method is presented in the memorandum entitled "Guidance for Estimating Carcinogenic Risks Associated with Exposures to Polycyclic Aromatic Hydrocarbons (PAHs) at Superfund Sites."

Comment 6: General comment 6. BN considers it unreasonable to consider all chromium to be in the +6 oxidation state and questions why chromium is considered at all.

Response: The assumption in this risk assessment that all chromium is in the +6 oxidation state is not based on evidence but on a lack of information on speciation. As stated in the RA, "No data are available on species of chromium present at the Montana Pole site." For this reason, the conservative assumption is made that all is present in the more toxic Cr^{+6} form." Even with this conservative assumption, chromium did not make any significant contribution to risks. Further discussion of geochemistry, which can be complex, seems superfluous. Also see response to Comment 1 in this section.

Comment 7: General comment 7. It would be helpful to provide a combined qualitative/quantitative approach to discussing uncertainties in the risk assessment.

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Response: A combined qualitative/quantitative approach to discussing uncertainties provides valuable information, and there are *many* examples of such an approach used in Sections 5.6 and 7.6. However, for many uncertainties, data are inadequate to allow assigning a meaningful numeric range to bound the potential for over- or under-estimates. For example, exposure frequency, proportion of Cr⁺⁶ in soil, fraction of contaminated material ingested, and other parameters may vary from zero to some undefined upper bound (perhaps 365 days or 100%) without any data on which to base even a most likely value. Quantitative uncertainty estimates are not likely to be useful in these instances, therefore they are assessed in qualitative terms. Individuals with knowledge of site conditions can effectively use such descriptions to form an understanding of uncertainties in exposures and risks.

Comment 8: Page ES-21. 591 ug/kg should be changed to 591 ug/L.

Response: The correction in units has been noted.

Comment 9: Page 2-4, last paragraph. BN states that regional background risks not associated with site activities (i.e. metals) are not appropriate for consideration during cleanup.

Response: Historical mining and its associated release of metals is important and is addressed in Sections 4.4, 4.5.2.2, 5.4.1.3, and elsewhere in the document. Also see response to Comment 1 in this section.

Comment 10: Table 4-1. BN asks why anthracene was considered a chemical of concern. Also the slope factor for benzo(a)anthracene is questioned.

Response: Based on the risk-based value for soil, anthracene could have been omitted as a chemical of concern. Its contribution to risk is negligible and does not impact the results of the RA. The correction of the typographical error in the slope factor for benzo(a)anthracene has been noted. It should also be noted that the *correct* slope factor was used in calculating risk estimates.

Comment 11: Table 4-2. BN asks why benzo(b)fluoranthene was considered a chemical of concern.

Response: The table is misleading in stating that benzo(b)fluoranthene was retained because it exceeded its risk-based value. All carcinogenic PAH compounds were retained as chemicals of concern in the RA even if a particular substance did not exceed its risk-based value. This approach is consistent with methods for assessing carcinogenic risks from complex mixtures of similar compounds, such as PAHs.

Comment 12: Table 4-5. Same as comments 10 and 11.

Response: See response to comments 10 and 11.

Comment 13: Page 5-13, Table 5-5. BN states that the fraction absorbed (1.9) is

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inappropriate.

Response: The comment is noted. The fraction absorbed should not have been included in Table 5-5, and was not used in calculations or text.

Comment 14: Page 5-30, second paragraph. The alternative approach for determining the upper control limit for PCP is questioned. It appears that there is a bimodal distribution of PCP. Concentrations of PCP above the solubility limit as they relate to risk calculations are questioned.

Response: It is not clear that a bimodal distribution is present for PCP, though such is possible. Of greater significance, however, is the distribution of possible *exposures*. The risk assessment, in essence, assumes random well placement on the Montana Pole site with screened intervals over the entire saturated zone. Such a well would draw water from surrounding portions of the aquifer such that a well placed in the "cleanest" spot (the bottom of the aquifer upgradient of the major process areas) would draw more contaminated water above and laterally. Similarly, a well placed at the "dirtiest" spot (the top of the aquifer under the process area) would draw less contaminated water below and laterally. In the latter case, even where free product and/or emulsions are present, blending of water in the hypothetical well could theoretically allow for mixing and dissolution. The final exposure point concentration in the risk assessment of 6,500 µg/L is ten times less than the solubility reported in Merck Index and is thus consistent with the above considerations.

Comment 15: Page 6-1, last paragraph. The reference to section numbers should be to Section 6, not Section 5.

Response: The corrected references to section numbers have been noted.

Comment 17: Page 6-12, third paragraph. It should be noted that the MCL was derived taking into consideration the potential essential nutrient value of arsenic.

Response: Since the MCL was initially established in 1942 and significant research on essentiality was conducted in the 1970s and 1980s, it seems unlikely that essentiality was a significant factor in the development of the MCL. The plausibility of arsenic as an essential human nutrient is recognized.

Comment 18: Page 6-14, second paragraph under 6.3.2. BN questions consideration of all chromium as present in the +6 form.

Response: See response to Comment 6 in this section.

Comment 19: Page 6-36, first paragraph. BN notes that EPA established interim guidance on soil lead cleanup.

Response: EPA's interim guidance on soil lead cleanup levels is recognized.

Comment 20: Page 7-3, Table 7-1. BN questions the consideration of cadmium as a chemical of concern.

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Response: Cadmium could have been omitted as a chemical of concern. Accordingly, as presented in the BRA, its contribution to the Hazard Index is inconsequential.

Comment 21: Page 7-26, second paragraph. BN questions why hazard indices for dioxins/furans and phenols are combined.

Response: It is common practice to first add all hazard quotients to determine an overall hazard index. If the hazard index exceeds one, then a further evaluation is necessary based on target organs to determine if a noncancer threat actually exists. In this risk assessment, noncancer effects of phenols and dioxins are appropriately discussed separately, not additively, in the text. This is in accord with the statement referred to in the comment, and standard risk assessment practice.

Comment 22: Page 7-28, fourth paragraph. BN questions consideration of impacts of lead in groundwater.

Response: The statement that "The potential impact of lead in groundwater on blood levels is significant" must be read in the context of the entire discussion. Even though the model predicts that only about three percent of children will have blood lead concentrations in excess of 10 $\mu\text{g}/\text{DL}$ from exposure to lead in groundwater, geometric mean blood lead concentrations predicted are significantly increased over those from "default" exposures (3 $\mu\text{g}/\text{DL}$ compared to 5 $\mu\text{g}/\text{DL}$). Also, the impact of using the default geometric standard deviation (GSD) is explained. If the alternate GSD is used then up to 12 percent of children may have blood lead levels in excess of 10 $\mu\text{g}/\text{DL}$. Both relative and absolute comparisons are important for the interpretation of potential lead exposures.

5.1.4 Comments on Proposed Plan

Comment 1: General comment 1. The Proposed Plan must be revised to reflect BN comments on the RI, FS and BRA.

Response: Based on the comments received on the RI, FS and BRA, MDHES does not agree that the Proposed Plan should be revised. None of the comments result in any changes in MDHES's interpretation of the nature and extent of contamination at the site, nor do they affect feasibility study considerations.

As stated in response Section 2.3, ARCO will make the appropriate corrections to the RI and FS Documents for final administrative record copies. Additionally, all tables, figures and analytical data used in the ROD will be corrected prior to their inclusion in the ROD.

Comment 2: General comment 2. BN questions the appropriateness of the residential scenario and the justification for taking cleanup action.

Response: MDHES believes that consideration of the residential scenario was appropriate under EPA guidance and the NCP. The agencies have ample justification for taking cleanup action at this site. See Sections 2.1 and 2.2.

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Comment 3: General comment 3. BN questions how cleanup levels were determined with relation to human health risks and questions MDHES's justification for cleanup action based on risk levels.

Response: The Preliminary Remedial Action Goals were developed for the FS based on single contaminant, single pathway risk levels corresponding to 10^{-6} . The cleanup levels in the Proposed Plan were developed considering a multi-contaminant, multi-pathway analysis. The statement "These levels would be protective to within a 1 in 10,000 cancer risk level for residential and industrial land use at the site" means exactly that; the word "within" meaning "not beyond the quantity, degree, or limitations of." The proposed cleanup levels correspond to the following residential land use risks:

<u>Chemical</u>	<u>Cleanup Level</u> (ug/kg)	<u>Risk</u>		<u>COC</u>
		<u>Ingestion</u>	<u>Dermal</u>	<u>Total</u>
PCP	8200	5.73×10^{-7}	2.42×10^{-6}	2.99×10^{-6}
Dioxins/Furans	0.048	4.21×10^{-6}	1.77×10^{-6}	5.98×10^{-6}
B2 PAH (TEFs)	236	1.00×10^{-6}		1.00×10^{-6}
	Total Pathway	5.8×10^{-6}	4.2×10^{-6}	
			Total	1.0×10^{-5}

Pathway risk levels and total risk can also be calculated for industrial exposure.

Justification for cleanup action is discussed in Section 2.2. As OSWER Directive 9355.0-30 states "Once remedial action has been determined to be warranted, the results of the baseline risk assessment may be used to modify preliminary remediation goals."

Comment 4: Page 2, paragraph 2. BN questions the 30 year cleanup period under Alternative 5B.

Response: Thirty years is the period of time evaluated from a costing standpoint in the Feasibility Study. All of the alternatives are evaluated over a 30 year period. MDHES's point is that the remedy which treats the largest quantity of contaminant source material has the highest likelihood of being fully successful within the 30 year period. To attempt to quantify actual time to cleanup at this time would require very complex and expensive scientific study. Even with extensive study, the level of uncertainty of the estimate would be high.

Comment 5: Figure 3. BN questions how surface soil contamination "hot spots" were delineated.

Response: The method used to map the extent of contamination is presented in the FS

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which is based on the data collected during the RI. The delineation of "hot spots" is based on both surface and subsurface soil sampling data presented in the RI. The extent of contamination in the "hot spot" areas is an estimate based on all available soil sampling data from those particular areas of the site. Since samples from those areas are closely spaced (Figures 4-1 and 4-3 of the RI), MDHES considers the assessment accurate for FS and ROD purposes. During the Remedial Action, verification sampling in these areas will be necessary to ensure remediation in conformance with ROD requirements.

Comment 6: Page 6, paragraph 6. BN maintains that the residential scenario and the domestic use of groundwater are unreasonable.

Response: See Section 2.1.

Comment 7: Page 6, paragraph 9. BN questions the cleanup criteria.

Response: See response to Comment 3 in this section.

Comment 8: Page 6, paragraph 10. BN questions the appropriateness of MCLs as groundwater cleanup goals.

Response: See Section 2.1.

Comment 9: Page 13, paragraphs 4 through 6. BN states that short-term effectiveness and implementability of Alternative 3 (capping) are much better than Alternatives 4 and 5.

Response: There is no anticipated significant risk to nearby residents if ambient air monitoring and proper engineering controls are conducted during the remedial action at the site.

Control of construction accidents is an important consideration for any construction activity. From a Feasibility Study evaluation standpoint, however, unless there is clear risk outside of what can be reasonably managed by proper health and safety planning and implementation, and compliance with OSHA regulations are complied with, this factor has little influence on the remedial action decision process.

Release of contaminants from the site is very important to control during the remedial action. Air monitoring in combination with dust suppression and other engineering controls as necessary are used during all major excavation activities at Superfund sites. MDHES anticipates that short term risks to nearby residents can be effectively prevented by application of careful construction techniques and appropriate engineering controls.

MDHES agrees that it would be easier, from a construction standpoint, to place a cap over the site. However, MDHES considers excavation as proposed to be readily implementable.

Soil washing and biological treatment are proven technologies for the contaminants of concern and soil types present at the MPTP site.

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Comment 10: Page 13, paragraph 12. BN questions justification for selection of Alternative 5B and suggests that Alternatives 2 or 3 could satisfy the statutory requirements of CERCLA.

Response: MDHES feels there is clear justification for a remedial action decision at the MPTP site. The purpose of the RI is to collect enough data to delineate the nature and extent of contamination necessary for evaluation and selection of a remedial action for the site. The RI at the MPTP site was effective in meeting this requirement. The FS is a development and evaluation of alternative remedies against EPA's nine evaluation criteria. The FS for the MPTP site was effective in providing this analysis. RI data and FS evaluations cannot be relied upon for all RD considerations. Design studies serve the purpose of answering specific questions required for actual design of the remedy.

Soil washing and biological treatment are proven technologies for the contaminants of concern and soil types present at the MPTP site. Additionally, treatability studies were conducted on both of these technologies by ARCO as part of the FS process.

The Feasibility Study provides a comprehensive evaluation and comparison of the alternatives against all nine of the EPA evaluation criteria. The last section of this comment provides only selected evaluation of the criteria and is best addressed by referring to the comprehensive comparative analysis in Section 6.5 of the Feasibility Study which considers the commenters issues in addition to other important FS issues.

5.1.5 Comments on Feasibility Study Report

Comment 1: Major comment 1. The cleanup levels and remedial alternatives presented in the FS do not meet expectations described in the NCP. No principal threats exist.

Response: See Section 2.1 and 2.2.

Comment 2: Major comment 2. BN states that the selected remedial alternative cannot meet the soil cleanup levels, and questions the potential need for a cap after treatment of soils.

Response: Although we have not seen any actual data to date which indicates that the proposed remedy cannot meet cleanup levels, MDHES is continuing to evaluate soil cleanup criteria. The actual level of contaminant reduction that will be provided through biological land treatment cannot be known until in-field pilot studies or full scale application is conducted. Based on available information on biological treatability of the contaminants of concern at the MPTP site, MDHES is confident that biological treatment will be effective in addressing the soil contamination to acceptable levels. Typically, the contaminants left in the soils after biological land treatment are those that are tightly bound to the soil particles, and therefore only minimally transportable to groundwater.

With respect to the possible need for a cap, MDHES does not believe that a cap will be

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necessary after biological land treatment, but if the level of cleanup attained still poses a human health risk via the surface soils pathway, a soil/vegetative cap may be appropriate. Such a cap would be designed to eliminate the surface exposure pathway. As mentioned in the above paragraph, the underlying soils would be treated to the degree possible, thus resulting in much decreased long term impacts to groundwater (greater long term effectiveness than just capping). Under the capping scenario of Alternative 3, heavily contaminated soils are left in place in contact with the groundwater.

Comment 3: Major comment 3. BN states that it is inappropriate to use a 7-percent discount rate or to mark-up some specific cost items as done in the FS.

Response: See Section 2.6 for discussion of costing information including the discount rate.

MDHES does not consider the effect of the apparent mark-ups on mobilization and demobilization costs to be outside of acceptable feasibility study cost criteria of +50 percent and -30 percent. MDHES will request that ARCO address this issue on subsequent cost estimates.

Comment 4: Page E-3, last line. Remedial action objectives for groundwater should not include remediation for use as a drinking water supply.

Response: See Section 2.1.

Comment 5: Page E-5, paragraph 1. BN questions elimination of Alternative 2 (institutional controls only) in the FS.

Response: Among other important issues presented in the FS, if institutional controls are used alone, then the impacts to Silver Bow Creek from the site are left unaddressed and uncontrolled. This is clearly unacceptable and therefore eliminates further consideration of Alternative 2. The existing groundwater controls and treatment are for control of LNAPL migration to the creek, but do not prevent migration of dissolved phase contamination to the creek.

Comment 6: Page E-5, paragraph 2. Institutional controls could be strengthened at minimum cost.

Response: Comment is noted. The advantages and disadvantages of institutional controls are presented in detail in the FS. MDHES feels the comment has been addressed in the FS and Proposed Plan.

Comment 7: Page E-10, Paragraphs 1 and 2. The short-term effectiveness and implementability of Alternative 3 are greater than Alternative 4 and 5.

Response: See response to Comment 9 in Section 5.1.4.

Comment 8: Page 1-12, paragraph 5. BN notes that reference to Figure 1-10 should be to

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Figure 1-11.

Response: Comment is noted, but is not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. Also see Section 2.3.

Other BN comments regarding specific discrepancies in the FS which MDHES does not consider to have overall impacts to the RI, BRA, FS or Proposed Plan include comments on: page 1-13 paragraphs 3 and 4, page 1-15 paragraph 1, page 2-2 paragraphs 2 and 3, page 2-4 paragraphs 1 and 3 and 4, page 2-5 paragraph 2, page 2-6 paragraph 3, page 2-7 paragraph 2, page 2-11 paragraphs 2 and 3 and 4, page 2-12 paragraph 1, page 2-13 paragraph 3, page 2-15 paragraph 4, Section 2.1.7 pages 2-16 and 2-17 paragraphs 2-7, page 2-19 paragraph 3, page 5-8 last paragraph; Tables 2-1, 2-2, 2-3, 2-4, 2-5, 2-6, 2-9, 3-5, and 5-3; and Figures 1-11, 1-12, 2-3, 2-8, 2-20, 3-1, and 4-2.

Comment 9: Page 1-14, paragraph 3. BN questions slug test analytical procedures.

Response: See response to Comment 5 in Section 5.1.2.

Comment 10: Page 2-1, paragraph 4. BN considers the LNAPL recovery system and infiltration galleries as potential sources.

Response: The question of whether or not the LNAPL recovery system and the infiltration galleries are "sources" of contamination at the site is currently being considered in a legal format by parties not including MDHES. Also see Section 2.5.

Comment 11: Page 2-2, paragraph 1. The assumptions used to calculate the volume of surface soils greater than 15 mg/kg are not provided.

Response: Estimates of areal extent of contamination were made from surface and subsurface PCP data. The PRAG of 3 mg/kg PCP was used. Volumes in areas where only surface contamination was shown by the data were estimated to a depth of three feet. Where contamination was continuous from the surface to the groundwater table, areas were multiplied by the average depths, limited to four feet below the water table. The volume associated with the LNAPL plume was calculated using the estimated areal extent of the plume from the figures and a thickness of six feet, which assumed contamination extending from 2 feet above the water table to four feet below the water table.

Comment 12: Page 2-2, paragraph 3. BN identifies data discrepancies and states that the FS statement that "the lowest concentrations were found along the perimeter of the site" is inaccurate.

Response: Comments on discrepancies are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. The sentence in the paragraph which states that the lowest concentrations are found along the perimeter could be reworded to state that the lowest concentrations (from test pit samples) were found along the perimeter, or outside of the former process area.

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Comment 13: Page 2-3, paragraph 2. BN identifies data discrepancies and states that the former wood treating operations area is not defined in the FS.

Response: Comments on discrepancies are noted, but are not considered to effect the overall conclusions of the RI, BRA, FS or Proposed Plan. The former wood treating operations area is labeled as the Former Pole Plant in Figure 1-3. Figure 2-3 presents select surface soil data and a delineation of contaminated areas. The reader should refer to the RI for specific sampling results from the Surface Grid Sampling Program.

Comment 14: Page 2-4, paragraph 1. BN requests definition of the historic drainage ditch.

Response: The historic drainage ditch is the main surface water drainage that runs north through the center of the site and drains to Silver Bow Creek. It is shown on numerous figures in the FS. Based on available information on former operations at the Montana Pole facility, the ditch acted as a major drainage pathway for spilled and discharged fluids during the period of wood treating activities.

Comment 15: Page 2-4, paragraph 2. BN notes that Table 2-2 is missing from the report.

Response: Table 2-2 is included in MDHES's version of the FS. It must have been inadvertently left out of BN's copy.

Comment 16: Page 2-7, paragraph 4. BN requests basis for extent of groundwater contamination.

Response: The basis for the extent of the groundwater contamination is the data presented in the RI.

Comment 17: Page 2-9, paragraph 2. Data do not support FS statement that concentrations of PCP decrease in a downgradient direction from the former pole treating area. PCP is dependent on pH of the water. Location of the historic drainage ditch is not defined.

Response: MDHES agrees that the first statement regarding concentrations of PCP decreasing in the downgradient direction is misleading. Site groundwater is highly contaminated from the central portion of the site all the way to Silver Bow Creek. PCP variation with pH is discussed in Section 5.1.2, Comment 3. See response to Comment 14 in this Section for a description of the historic drainage ditch.

Comment 18: Page 2-13, paragraph 1, and Page 2-13, paragraph 3. BN questions measurements of LNAPL thickness.

Response: See response to Comment 9 in Section 5.1.1.

Comment 19: Page 2-18, paragraph 1. BN requests clarification regarding soil samples within the drainage ditch.

Response: The drainage ditch is shown on Figure 1-3. Soils data are shown on Figures 2-3 through 2-7.

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Comment 20: Page 2-18, paragraph 2. LNAPL has been measured in wells at thicknesses greater than 2.2 feet, as reported in the RI report.

Response: The maximum thickness of LNAPL measured in a site monitoring well during the RI investigations was 2.2 feet as reported in the RI. Measurements taken by the Montana Bureau of Mines at the site have been greater than this thickness.

Comment 21: Page 2-20, paragraph 2. Section 1.2.2 does not exist.

Response: Reference should be to Section 1.2.

Comment 22: Page 2-25, Section 2.3.1. BN questions the use of MCLs for groundwater and surface water cleanup criteria.

Response: Groundwater cleanup criteria were based on MCLs as an ARAR considering groundwater as a potential drinking water supply. Also see response Section 2.1. The cleanup criteria for Silver Bow Creek is based on the Montana Water Quality Act I-Classification. Other comments are noted.

Comment 23: Page 2-34, paragraph 1 and Page 3-3, third bullet. BN questions the use of drinking water standards for groundwater cleanup criteria.

Response: See Section 2.1.

Comment 24: Page 3-7, paragraph 3 and Table 3-1. BN questions the risk levels of the PRAGs in Table 3-1.

Response: Risk levels for dioxins/furans and PAHs in Table 3-1 correspond to 10^{-6} risk levels not 10^{-4} as indicated. This is a typo.

Comment 25: Page 3-7, last sentence. BN requests justification of cleanup beyond attainment of 10^{-4} risk level.

Response: See Section 2.2.

Comment 26: Page 3-8, paragraph 2. BN questions PRAGs more stringent than MCLs for groundwater.

Response: MCLs are based on human health risk calculations, but are not specific to site conditions. Guidance allows establishing cleanup levels lower than MCLs where cumulative health effects from multiple chemicals are present at the site.

Comment 27: Page 3-9, paragraph 1. BN questions the FS conclusion that there is little difference between soil volume estimates based on cleanup criteria between 3 mg/kg and 34 mg/kg.

Response: In only very few instances were soil concentrations found between 3 mg/kg and 34 mg/kg. The concentrations were generally considerably less than 3 mg/kg or considerably more. Close evaluation of the area that would require excavation to meet a 3 mg/kg value versus a 34 mg/kg value indicates very little difference in volume.

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Comment 28: Page 3-9 through 3-11. It is assumed that the volume estimates represent cleanup to a 10^{-6} risk.

Response: Volume estimates do represent cleanup to a 10^{-6} risk.

Comment 29: Page 3-11, paragraph 2. BN questions the estimated volume of contaminated groundwater. A more useful value would be a pumping rate and an estimated duration.

Response: The cost estimate is based on a specific pumping rate for a specific period of time. As stated in this section of the FS, the volume estimate represents the volume of contaminated groundwater in place and not the volume which would be treated by a pump and treat system. Not enough specific information about soil characteristics, quantity of LNAPL and other geochemical and hydrogeologic parameters are known to develop a useful estimate of the quantity of groundwater to be treated to achieve aquifer remediation.

Comment 30: Page 4-8, paragraph 3. BN questions why soil flushing was eliminated from site-wide consideration.

Response: Soil flushing was eliminated from site-wide considerations for a number of reasons including the anticipated presence of preferential flow pathways causing nonuniform treatment, potential dispersion of the LNAPL plume, and effectiveness and costs as compared to excavation. Although in-situ bioremediation may also be limited by preferential flow pathways, it will be applied to inaccessible residual LNAPL and soil contamination and to dissolved phase groundwater contamination and is considered by MDHES to be the most practical approach available for long-term groundwater remediation at the site.

Comment 31: Page 4-11, paragraph 2. BN opposes any on-site incineration and questions why off-site incineration was eliminated.

Response: MDHES recognizes BN's opposition to on-site incineration. Off-site incineration was not eliminated from consideration for oils and sludges but was eliminated for treatment of soils due mostly to excessive costs.

Comment 32: Page 4-16, paragraph 3. BN questions elimination of solvent extraction for oils and sludges.

Response: Solvent extraction is used to separate oily materials from contaminated soils and other solids. It is not considered appropriate for treatment of pure wastes such as oils and sludges since little if any volume reduction is attained, and the end product requires further treatment.

Comment 33: Page 4-19, second full paragraph. BN questions method of averaging concentrations and questions LNAPL thickness data.

Response: MDHES does not know the details of how ARCO calculated average concentrations. However, the average concentrations have no bearing on the feasibility study analysis or the regulatory decision making process.

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Regarding LNAPL thickness, see response to Comment 20 in this section and response to Comment 9 in Section 5.1.1.

Comment 34: Page 4-22, paragraph 3. No reference/basis is provided for the assumed hydraulic conductivity of the aquifer.

Response: The basis for the assumed hydraulic conductivity is the analysis provided in the RI document.

Comment 35: Page 4-23, paragraph 1 and page 4-24, paragraph 1. Quantity of discharge of contaminated groundwater to Silver Bow Creek is questioned.

Response: The analysis of estimated discharge to Silver Bow Creek is a feasibility study analysis not a design study analysis. Further evaluation of discharge to Silver Bow Creek to a much greater degree of accuracy, combined with groundwater and surface water monitoring, will be required during design and implementation of the remedial action to effectively prevent continued impacts to the creek via a groundwater control and treatment system.

Comment 36: Page 4-24, paragraph 2. BN questions the 3000 gallons per year LNAPL recovery estimate.

Response: MDHES considers the quantity estimates adequate for feasibility study analyses but recognizes the high level of uncertainty with this estimate. Actual quantities will become apparent during RD and RA activities and appropriate responses to lower or higher quantities than expected will be developed.

Comment 37: Page 4-26, paragraph 2. BN states that if MCLs are an ARAR for discharging to Silver Bow Creek, remedial methods for addressing metals in groundwater should have been included in the FS.

Response: Metals concentrations in groundwater above MCLs are only found near Silver Bow Creek. It is expected that average concentrations of metals in recovered groundwater at the site will be less than MCLs. The FS report addresses the potential need for metals treatment and, as stated in the FS, determination of the need for treatment (and type of treatment) for metals can be made during remedial design.

Comment 38: Page 5-3, paragraph 3. BN states that is technically impractical to remediate the aquifer to the groundwater goals. Additionally BN states that other groundwater measures besides extraction and above ground treatment (e.g. plume containment) should have been developed in the remedial alternatives.

Response: MDHES recognizes the difficulty of remediating the contaminated aquifer to drinking water standards. Justification for taking action is based on many considerations as discussed in response Section 2.2. Groundwater containment measures were considered in the development of alternatives.

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Comment 39: Page 5-29, 1st full paragraph. BN warns of pitfalls of injecting treated water on-site containing metals concentrations above MCLs.

Response: MDHES will consider this comment in any oversight activities we may provide during RD and RA.

Comment 40: Page 5-31, 1st full paragraph and Page 5-33, 2nd full paragraph. BN questions whether sheet piling costs, etc. were included for excavation near Silver Bow Creek and in areas where flowing sands may be present.

Response: MDHES feels that the excavation costs in the FS report are conservative and would account for specialized construction techniques such as installation of sheet piling where appropriate.

Comment 41: Page 6-25, 1st full paragraph. BN questions the selection of bioremediation as the soil treatment approach when anticipated degradation of dioxins and carcinogenic PAHs is limited.

Response: The only treatment technology which would be expected to be fully effective on these contaminants of concern is incineration. MDHES considers the benefits of treating the degradable portion (majority) of the contaminated material by biodegradation to far outweigh the limitations of this technology at the site. Also see Comment 2 in Section 5.1.5.

Comment 42: Page 6-28, 1st line. BN states that if aquifer restoration is the reason why Alternative 5B is preferred, further explanation is required to describe why the most costly alternative has been selected if groundwater restoration will require up to five decades to accomplish.

Response: Alternative 5B is not the most costly alternative. Alternatives 3A, 4A, 5A and 5C are more costly. Regardless, MDHES considers the selected remedy to be the most cost effective approach which is not anticipated to be maintained in perpetuity.

Comment 43: Page 6-28, paragraph 1. BN states that since LNAPL beneath the interstate is immobile, a low permeability cap for other areas would be an appropriate and cost effective method for the site.

Response: The FS states that after flushing beneath the highway to remove LNAPL, the remaining LNAPL would be essentially immobile. Without LNAPL recovery, capping will not be an effective method of reducing mobility of contaminants to the groundwater since the LNAPLs are floating on the groundwater surface. Other comparative analyses of capping versus excavation are provided in the FS.

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5.2 Comments from the Atlantic Richfield Coal Company (ARCO)

5.2.1 Comments on Proposed Plan

The following are responses to comments provided in Appendix C.

Comment 1: General comment 1. Future use of groundwater for domestic water supply is unreasonable.

Response: MDHES's conclusion that residential land use including domestic use of groundwater at the site is reasonable. Current zoning allows residences to be established as they have been in the past. MDHES considers the Oaas residence to be on-site. On most of the site, installation of domestic wells for drinking water is not prohibited by the well ban. Also see Section 2.1.

Comment 2: General comment 2. The cleanup levels are inconsistent with the final FS report.

Response: See response to Comment 3 in Section 5.1.4.

Comment 3: General comment 3. The procedures and assumptions followed in the revised final BRA are flawed. ARCO refers to Appendix 1 of their comments for specific risk assessment comments.

Response: MDHES disagrees that the BRA procedures and assumptions are flawed. MDHES addresses ARCO's specific comments below.

Comment 4: General comment 4. The projected costs for soil washing and groundwater treatment are not accurate. ARCO specifically notes that they did not include the cost for design and operation of a soil flushing system in the feasibility study.

Response: Based on data gathered by ARCO during the remedial investigation and treatability studies, soil washing appears to be a viable technology for treating soils at the site. However, MDHES generally agrees that soil washing is more costly than bioremediation. Bioremediation is the selected soil treatment technology.

As soil flushing was described as an integral part of Alternative 5 in the FS, ARCO should have accounted for these costs. Since completion of the FS, ARCO has provided these costs to MDHES. The soil flushing costs have been accounted for in the Record of Decision and don't significantly alter the total cost of the selected remedy.

Comment 5: Overall Protection of Human Health and the Environment. ARCO disagrees with MDHES's evaluation of overall protection of human health and the environment. ARCO believes that Alternative 3 is equally protective as Alternative 5.

Response: As evaluated in the FS, MDHES believes that Alternatives 3, 4 and 5 could be protective of human health and the environment. However, the degree of protection

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provided by Alternative 3 is dependent upon effective long-term maintenance of the cap and the groundwater system since very little removal and treatment of contamination would occur. Additionally, institutional controls designed to prevent site activities which may result in human exposure would have to be maintained and effectively enforced indefinitely.

It is clear to MDHES that the remedy which treats the largest quantity of contaminant source material has the highest likelihood of providing cleanup to a point where discontinuation of long term site controls is achieved. With only limited removal of LNAPLs under Alternative 3, it is certain that effective engineering and institutional controls will be required indefinitely. Indefinite reliance upon engineering and institutional controls inherently results in continual potential risks from the site which would be reduced if the source material were treated as proposed in Alternative 5.

Comment 6: Compliance with ARARs. ARCO states that achieving compliance with MCLs cannot be achieved within 30 years. ARCO questions the effectiveness of excavation for the recovery of LNAPLs and states that 40 percent of the LNAPLs are located beneath the interstate highway.

Response: MDHES recognizes the difficulty and uncertainty of remediating site groundwater to drinking water quality. Thirty years is the period of time evaluated from a costing standpoint in the Feasibility Study. All of the alternatives are evaluated over a 30 year period. The remedy which treats the largest quantity of contaminant source material has the highest likelihood of being fully successful within the 30 year period. To attempt to quantify actual time to cleanup at this time would require very complex and expensive scientific study. Even with extensive study, the level of uncertainty of the estimate would be high.

MDHES believes that excavation, and LNAPL recovery from the excavated areas with skimmer pumps, is the most effective means available for recovery of LNAPLs. Although ARCO states that less than 50 percent of LNAPLs will be recovered with this method, they provide no actual supporting data. In the FS, ARCO estimated that between 80 and 90 percent of LNAPLs would be recovered under the preferred alternative.

Regarding the quantity of LNAPLs beneath the highway, MDHES strongly questions ARCO's estimate of 40 percent of total LNAPL quantity. Additionally, recovery of the LNAPLs in this area not accessible to excavation will be enhanced with soil flushing and other appropriate methods during the remedial action.

Comment 7: Long-Term Effectiveness and Permanence. ARCO states MDHES's assumption that "the volume of LNAPL which is excavated has a corresponding effect on the time required for groundwater remediation" is unsubstantiated. ARCO also reiterates their estimate of less than 50 percent recovery of LNAPLs under Alternative 5. ARCO states that MDHES has improperly concluded that Alternative 5 provides the greatest assurance of long-

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term effectiveness and permanence.

Response: Although ARCO attempted to bias the results of the treatment period analysis in Appendix 2 by assuming a pumping rate under Alternative 5 of four times less than the pumping rate for Alternative 3, the supporting calculations clearly show that the quantity of LNAPL removed has a direct effect upon the time required for groundwater remediation. The more LNAPL removed, the less time required for completion of the remediation program.

In response to ARCO's estimate of less than 50 percent recovery of LNAPLs under Alternative 5, see response to Comment 6 in this section.

Since the selected remedy results in the greatest quantity of source material including LNAPL recovered and treated, MDHES is confident that discontinuation of engineering controls and institutional controls will occur sooner than under any of the other alternatives. Thus MDHES considers the selected remedy to provide the highest degree of long term effectiveness and permanence of all the alternatives considered. Also see Section 2.4.

Comment 8: Reduction of Toxicity, Mobility and Volume. ARCO reiterates that their calculations in Appendices 2 and 4 show that the reduction in volume of hazardous substances achieved through excavation will not significantly reduce the time required to remediate groundwater.

Response: Under the selected remedy, significant reduction in volume and toxicity is achieved over the other alternatives considered. Also see responses to comments 6 and 7 above.

Comment 9: Short Term Effectiveness. ARCO disagrees with the generally equal evaluation of short term effectiveness provided for Alternatives 3, 4 and 5 in the FS. ARCO contends that Alternative 3 has greater short term effectiveness than Alternative 5.

Response: Control of construction accidents is an important consideration for any construction activity. From a Feasibility Study evaluation standpoint, however, unless there is clear risk outside of what can be reasonably managed by proper health and safety planning and implementation, and compliance with OSHA regulations, this factor has little influence on the remedial action decision process.

Release of contaminants from the site is very important to control during the remedial action. Air monitoring in combination with dust suppression and other engineering controls as necessary are used during all major excavation activities at Superfund sites. MDHES anticipates that short term risks to nearby residents can be effectively prevented by application of careful construction techniques and appropriate engineering controls.

Comment 10: Implementability. ARCO recognizes that all the alternatives are implementable, however, they state that Alternatives 4 and 5 are substantially more difficult

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to implement than Alternative 3.

Response: MDHES agrees that it would be easier, from a construction standpoint, to place a cap over the site. However, MDHES considers excavation as selected to be readily implementable. Also see response Section 2.4.

Comment 11: Cost. ARCO contends that additional costs for implementation of Alternative 5B [over Alternative 3] is not warranted and may be inconsistent with the NCP.

Response: MDHES agrees that it is more costly to remove and treat contamination at the site than to leave it in place. The basis for MDHES's selected alternative is the evaluation of all nine criteria weighted in accordance with the NCP. This is not inconsistent with the NCP, but rather follows the NCP exactly. ARCO's elevation of cost as the determining factor would be inconsistent with the NCP.

5.2.2 Comments from Appendix 1 on Proposed Plan Risk Assessment Issues and Final BRA

Comment 1: Comments on the Proposed Plan. The discussion of site exposures and risks in the Proposed Plan is misleading with regard to both the types and magnitude of exposures and risks that could reasonably exist at the site. The cleanup levels presented in the Proposed Plan do not correspond with the Preliminary Remedial Action Goals (PRAGs) presented in the FS report or with the stated target risk level identified in the Proposed Plan.

Response: See Sections 2.1, 2.2 and response to Comment 3 in Section 5.1.4.

Comment 2: General Comment 1 [on the Baseline Risk Assessment]. ARCO disagrees with MDHES's consideration of future residential land use and the use of site groundwater as a drinking water supply.

Response: See Section 2.1.

Comment 3: General Comment 2. MDHES's risk assessment approach is inconsistent with the approach used at the Idaho Pole site.

Response: The differences in risk assessment approaches between the Montana Pole site and the Idaho Pole site are due to site specific considerations. Although it was assumed at Idaho Pole that on-site receptors would not use groundwater as a domestic supply, MDHES believes that it is reasonable to consider groundwater use at the Montana Pole site as zoning and the well ban do not prevent residential development and use of site groundwater for a drinking water supply. See Section 2.1.

Comment 4: General Comment 3. Inorganic compounds should not have been included as site chemicals of concern.

Response: See response to Comment 1 in Section 5.1.3.

Comment 5: Specific Comment 1. Page 3-2 has an inaccurate description of EPA's site

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activities beginning in 1985.

Response: MDHES considers the description adequate for BRA purposes. See Section 2.5 for discussion of the infiltration galleries.

Comment 6: Specific Comment 2. Page 5-5, Table 5-1. The exposure pathway to groundwater is incomplete for trespassers.

Response: The inclusion of "inhalation while showering" in the table is confusing. This should be ignored when interpreting this table. Otherwise, the table seems clear in indicating that no current groundwater exposures are contemplated. It is certainly possible theoretically that contact with groundwater via monitoring wells could result in ingestion and/or dermal absorption. The comment is correct in indicating that such actual exposures are highly unlikely currently, and this is the position taken in assessing site-related risks.

Comment 7: Specific Comment 3. Page 5-71. Since the absorption of arsenic in soil is less than that for arsenic in water, risk assessment calculations must account for the difference.

Response: See response to Comment 8 below.

Comment 8: Specific Comment 4. Pages 5-71 and 6-32. ARCO questions animal models used for assessing metals bioavailability.

Response: The comment addresses only one of many concerns with using animal models for direct quantitative extrapolation to humans. Even at that, the major point of coprophagy is missed. In rabbits, coprophagy is obligatory and control of reingestion of feces may result in physiological stresses. Control of coprophagy in swine is not expected to have such effects.

In any event, it cannot be established at this time whether results from any animal model overestimate or underestimate absorption. Certainly appropriate comparative studies are not available to even determine the difference among well studied animal models. Major anatomical and physiological differences among animals and humans suggest that direct quantitative extrapolation is not yet warranted. Rabbits, for example, consume large amounts of food relative to body weight, and process this food rapidly through a relative short intestinal tract. Both will tend to decrease relative absorption of soluble versus insoluble forms of arsenic, and probably other chemicals.

The State does not feel that current data are insufficient to justify a reduction in arsenic bioavailability. The argument advanced that no animal models are ideal cannot be construed to indicate that all animal models are therefore of equal value.

Comment 9: Specific Comment 5. Page 6-30. ARCO questions the use of the MCL as the reference dose (RfD) for evaluating noncarcinogenic health effects of 2,3,7,8-TCDD.

Response: The comment is correct that MDHES used the MCL for drinking water to

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establish an "RfD" for 2,3,7,8-TCDD. The State used professional judgement in taking this approach. Lack of an RfD on IRIS should not be taken to indicate that sufficient information is unavailable to characterize noncancer risks.

Comment 10: Specific Comment 6. Page 7-2. ARCO notes a table/text discrepancy.

Response: The correct risk value is found in Table 7-1, and an error is incorporated into the text. Both risk values are, however, far below any that would be of concern to human health.

Comment 11: Specific Comment 7. Page 7-10. ARCO notes a table/text discrepancy.

Response: The correct risk value is found in Table 7-9. No risks from arsenic as high as 10^{-3} were found anywhere on the Montana Pole site. The text is currently correct in characterizing arsenic risks as within the EPA risk range.

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5.3 Comments from Inland Properties, Inc.; Montana Resources, Inc.; and Dennis Washington.

The following are responses to comments provided in Appendix C.

5.3.1 General comments on the FS Report

Comment 1: General comment 1. Inland et al. question the use of the future residential land use scenario.

Response: See Section 2.1.

Comment 2: General comment 2. No alternatives are provided that include a combination of excavation and in-situ process options.

Response: Alternatives 3, 4 and 5 did include a combination of excavation and in-situ bioremediation. In addition, Alternative 5 includes a second in-situ process option: soil flushing.

Comment 3: General comment 3. Inland et al. question the effectiveness of excavation below the water table.

Response: See Section 2.4.

Comment 4: General comment 4. Biological land treatment under Alternative 5 will take much longer than estimated in the FS. Additionally, health risks to workers and nearby residents related to the land treatment unit should be addressed.

Response: MDHES considers the treatment period considered in the FS to be reasonable. Health risks to workers and nearby residents are discussed in the FS under the evaluation of short-term effectiveness. MDHES feels that application of health and safety measures per applicable regulations in combination with appropriate engineering and air monitoring will provide protection to workers and nearby residents.

Comment 5: General comment 5. Inland et al. question cleanup levels for soil and groundwater. Inland et al. are concerned that the inaccessible contaminated soils beneath the highway will prevent attainment of groundwater cleanup levels.

Response: Although we have not seen any actual data to date which indicates that the proposed remedy cannot meet cleanup levels, MDHES is continuing to evaluate soil cleanup criteria. The actual level of contaminant reduction that will be provided through biological land treatment cannot be known until in-field pilot studies or full scale application is conducted. Based on available information on biological treatability of the contaminants of concern at the MPTP site, MDHES is confident that biological treatment will be effective in addressing the soil contamination to acceptable levels.

Recovery of the LNAPLs in the area beneath the highway, inaccessible to excavation, will be

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enhanced with soil flushing and other appropriate methods during the remedial action. Still, MDHES recognizes the difficulty and uncertainty of remediating site groundwater to drinking water standards. The NCP calls for five year reviews of remedial action effectiveness on CERCLA sites. The findings of such reviews are used to evaluate the various components of the remedial action. Also see Section 2.1 and 2.4.

Comment 6: General comment 6. Inland et al. recommend the capping option rather than excavation and treatment since they consider the cleanup criteria unattainable. Additionally, Inland et al. are concerned about short term risks to workers and nearby residents under the preferred alternative.

Response: Although MDHES recognizes the difficulty and uncertainty of remediating site groundwater to cleanup criteria, cleanup action at the site is still justified. See Section 2.2. Regarding short-term risks, refer to response to Comment 9 in Section 5.1.4.

Comment 7: General comment 7. Inland et al. questions whether sufficient sampling of LNAPL thickness and groundwater concentrations has been conducted over time to adequately characterize the site.

Response: The RI data are extensive regarding delineation of the nature and extent of contamination at the site and are considered adequate for the purposes of selecting a remedial action approach. If significant temporal variations occur they can be responded to appropriately during the remedial action. It is unreasonable to suggest that a decision on site cleanup should not be made based on currently available data.

Comment 8: Section 2.1.4.8. Inland et al. suggest that the LNAPL volume estimate is an overestimate and the presence of preferential flow pathways will have a major impact on excavation alternatives.

Response: Although preferential flow pathways are expected to be present, RI data indicate that the LNAPL contamination is widely spread throughout the area depicted in the FS. Flow of LNAPLs may occur more rapidly through preferential flow pathways, but soils in the areas of lesser flow are still saturated with LNAPLs, based on RI data from random borings and test pits. It should also be noted that the depth of the screened interval in monitoring wells located within the LNAPL plume will dictate whether LNAPLs enter the well. The well logs should be reviewed carefully by the commenter to obtain a full understanding of information on the extent of the LNAPL plume.

Comment 9: Section 2.2.1. Inland et al. consider the southeast infiltration gallery a source of contamination.

Response: See Section 2.5.

Comment 10: Section 2.4.1.2. Inland et al. question the use of the future residential land use scenario and the potential use of site groundwater for domestic purposes. Inland et al. also question whether drinking water cleanup goals can be set below MCL levels.

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Response: See Section 2.1 and response to Comment 26 in Section 5.1.5.

Comment 11: Section 3.2.1. Inland et al. question PRAGs based on the residential land use scenario and the assumption that future residents could use site groundwater for drinking. Inland et al. states that under the industrial land use scenario, site dioxin concentrations already meet EPA recommendations. Also, Inland et al. question how PRAGs could be set lower than MCLs.

Response: See Section 2.1 for discussion of residential scenario. The EPA dioxin levels cited are from the approach that the Dioxin Disposal Advisory Group recommended for cleanup at Times Beach in 1988. Dioxin cleanup levels at Montana Pole will be based on the site specific risk assessment and ARARs.

MCLs are based on human health risk calculations, but are not specific to site conditions. Guidance allows establishing cleanup levels lower than MCLs where cumulative effects from multiple chemicals are present at the site.

Comment 12: Section 4.2.3. Inland et al. question why only in-situ bioremediation options that involve the use of water as a carrier have been considered. Neither soil venting nor air sparging were considered.

Response: The specific method of in-situ bioremediation applied to the site will be selected during the remedial design phase of the project. Soil venting and air sparging will likely be considered and will be applied if appropriate.

Comment 13: Section 4.2.4. Inland et al. suggest that since on-site incineration would not be acceptable to the community, the only two above ground treatment options are biological land treatment and soil washing.

Response: MDHES notes this comment.

Comment 14: Section 4.2.4.2. Biological land treatment may pose significant hazards to surrounding residents. Inland et al. state that excavation and above-ground treatment is not substantially different than in-situ soil venting but would require extensive excavation and result in short term risks.

Response: See response to Comment 9 in Section 5.1.4. for a discussion of short term risks posed by the preferred alternative. In-situ biodegradation by soil venting, air sparging or any other method is not effective when applied to high concentration wastes such as LNAPLs.

Comment 15: Section 4.2.4.3. Inland et al. question the viability of soil washing based on their assessment that a higher percentage of site soils are fine grained than presented in the FS.

Response: Based on data gathered by ARCO during the remedial investigation and treatability studies, soil washing appears to be a viable technology for treating soils at the

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site. However, MDHES generally agrees that soil washing is more costly than bioremediation. Bioremediation is the selected soil treatment technology.

Comment 16: Section 4.4.1. Inland et al. state that slurry walls should not be eliminated due to a lack of a low permeability zone to form the base of the wall. Additionally, Inland et al. state that operation of the infiltration galleries has resulted in contamination at the site to a greater depth than would be present without the infiltration galleries.

Response: MDHES recognizes that slurry walls and other containment structures are viable alternatives for use in groundwater containment. The lack of a low permeability zone to form the base of the containment wall will likely result in the need for hydraulic controls such as extraction wells in addition to the containment structures to prevent flow of contaminants beneath such structures.

MDHES is not aware of any data which indicate that the depth of contamination at the site has been influenced by operation of the infiltration galleries.

Comment 17: Section 4.4.2. Inland et al. questions why it is necessary to maintain hydrologic balance across the site and why reinjection of treated groundwater is a component of the groundwater treatment approach.

Response: Maintenance of hydrologic balance across the site is necessary to limit releases of contaminated groundwater to Silver Bow Creek and other off-site areas. Whether or not the remedial action will include reinjection of treated water on-site will depend on specific remedial design considerations, specifically the approach to in-situ bioremediation. The commenters' points on potential problems associated with reinjection of waters into contaminated areas will be considered during the remedial design phase of the project.

Comment 18: Section 4.4.4. What are the concentrations of metals in the effluent of the EPA's present water treatment facility?

Response: EPA provided the following sampling results to MDHES for effluent from the water treatment facility: arsenic - <6 ug/l, cadmium - 0.8 ug/l, copper - <11 ug/l, iron - <56 ug/l, lead - <6 ug/l, zinc - 170 ug/l. All of these constituents are below aquatic life criteria with the exception of zinc. The zinc concentration is less than the current I-classification standards which are applicable at this time. Thus, based on this limited amount of data, the water treatment system at the Montana Pole site is not likely to have to include metals treatment processes in the short term.

Comment 19: Section 4.4.4.4. Inland et al. recommend the use of two-pump systems for water/LNAPL recovery to minimize emulsification of oils prior to oil/water separation.

Response: The specific pumping arrangement applied in the full scale remedial action at the site will be determined during the remedial design phase of the project. The commenters' points will be considered.

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Comment 20: Section 5.0. Inland et al. state that the only area available for biological land treatment is the former pole storage yard (approximately 1,000,000 square feet).

Response: One million square feet will support a large land treatment unit capable of handling a large quantity of contaminated soil per lift. MDHES considers the available area more than adequate to support an appropriately sized biological land treatment unit.

Comment 21: Section 5.1. Inland et al. state that it is unreasonable to plan for the extensive use of recovery trenches in a groundwater extraction system at the site. The estimated volume of soils excavated under Alternative 4 will be more than stated in the FS.

Excavation below the water table will greatly increase the PCP concentration in the shallow groundwater, and it is likely that backfilling of excavated areas will lead to contamination of the clean soils. Dewatering of saturated soils will be a necessary component of excavation. A contaminated soils stockpile will be necessary and must be included in estimates of cost etc.

Response: MDHES considers the use of recovery trenches to be appropriate for long term remedial action at the site. The groundwater recovery system may also include wells in order to ensure prevention of off-site migration. EPA has shown that construction of recovery trenches at the site is possible. Regardless, the exact components and configuration of the groundwater recovery system will be determined during the remedial design phase of the project.

The soil volumes used for cost estimating purposes in the FS are considered accurate for alternative evaluation and comparison purposes. More precise soil volume calculations will be made during the remedial design.

The concentration of dissolved phase PCP in the shallow groundwater beneath the LNAPL is already at the saturation limit.

Backfilling of excavated areas would not occur until LNAPL is recovered to the maximum extent possible from the excavated area. Although some recontamination of backfilled soils may occur, the degree of contamination would be much less than the original soils previously in contact with the LNAPL, and in situ biological treatment would be used for further treatment of soils in contact with contaminated site groundwater.

MDHES recognizes that some dewatering of saturated soils may be necessary prior to transport to the land treatment unit or any soils storage areas. Dewatering is part of the selected alternative and may consist of simple methods of guiding drainage from excavated soils stockpiled on liners in the vicinity of the excavation back into the excavated areas.

Soils stockpiles may be used during the remedial action. As the commenter has noted, control of migration of contaminants from the stockpiles would be required. Consideration of the costs of soils stockpiles could have been provided in the FS, but is more a design issue

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than an FS issue. The lack of costs for this aspect of the remedial action in the FS is not considered to significantly affect the total cost of this alternative, thus has no influence on the remedial action decision making process.

Comment 22: Section 5.2.5. Inland et al. reiterates concerns expressed in previous comments on soil venting and air sparging, risks to nearby residents and workers, and cost and effectiveness of soil washing.

Response: See responses to Comments 12, 14 and 15 in this section.

Comment 23: Section 6.0. Alternatives should have been developed that contain more innovative combinations of excavation and in situ treatment so that the comparison of alternatives would not be based solely on the relative volumes of soil removed. At least one alternative should be provided that includes excavation of the reasonably accessible contaminated soils for above ground treatment along with some form of in situ treatment of the soils that are much more difficult and dangerous to excavate.

Response: The selected remedy will allow for some of the combinations suggested by Inland et al.

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5.4 Comments from Butte-Silver Bow Local Government

Comment 1: Support solution that relies on the best scientific advice and information, and removes the maximum amount of pollution from the area.

Response: Selection of the selected alternative is based on sound scientific information and advice and has been made only after consideration of all information provided by the interested parties. The selected alternative removes the maximum amount of pollution practicable.

Comment 2: Support the solution that uses bioremediation technologies.

Response: The selected alternative uses bioremediation technologies.

Comment 3: Support the solution that ensures the MT. Pole site can be remediated in sync with the cleanup of the full Lower Area One site.

Response: MDHES believes that the selected alternative can be implemented in sync with Lower Area One actions.

Comment 4: Support the solution that results in an acceptable land use in the long term.

Response: The selected alternative will allow anticipated land uses at the site.

Comment 5: Urges compromise on "residential" vs "industrial" land use.

Response: The agencies have considered the changes in land use likely to be implemented by the PRPs and Butte-Silver Bow. See Section 2.1.

Comment 6: Most importantly, BSB support the solution that has the support of its citizens.

Response: The selected alternative was overwhelmingly supported by BSB citizens.

Comment 7: Implement an alternative that guarantees implementation will not be compromised by technical problems nor cause delays.

Response: MDHES believes that the selected alternative satisfies this request. In addition, remaining technical issues will be refined during the detailed design phase of the project.

Comment 8: Urges compromise but should not compromise human health or the environment.

Response: Of all the alternatives considered, the selected alternative most fully satisfies the evaluation criteria including protection of human health and the environment.

5.5 Comments from Fritz Daily, Representative House District 69

Comment 1: Supports MDHES proposed Alternative 5B.

Response: MDHES recognizes Representative Daily's support for the preferred

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alternative.

Comment 2: Should not use temporary solutions which will ultimately require further remediation in the future.

Response: The selected alternative provides the greatest assurance of permanence of all the alternatives.

Comment 3: ARCO's proposed alternative 3 is irresponsible.

Response: MDHES believes that the selected alternative more fully satisfies the nine evaluation criteria than Alternative 3.

5.6 Comments from Mary Kay Craig, Clark Fork Pend Oreille Coalition

Comment 1: Supports MDHES proposed remedy.

Response: MDHES recognizes Ms. Craig's support for the preferred remedy.

Comment 2: Urges excavation under the interstate highway. Understand cost would only be about 10 percent more.

Response: MDHES obtained an estimate of the cost for removal and reconstruction of the highway from the Montana Department of Transportation. This cost was estimated at \$3.7 million. This cost does not include excavation and removal of contamination. The selected alternative calls for soil flushing of the area beneath the interstate to remove contaminants followed by in place bioremediation of remaining contamination. This remedy will remove much of the contamination under the highway and is considered by the agencies to be the appropriate remedy for this area.

Comment 3: Prefer bioremediation. However studies should be conducted beforehand to determine end-products.

Response: During the RI/FS ARCO conducted treatability studies on bioremediation. Also, there is a substantial amount of information available in the scientific community on bioremediation of contaminants like the ones found at the site. Site-specific information on end-products is not well defined, and will be determined more completely during detailed design studies.

Comment 4: Support investigation into use of white rot fungus. May reduce cleanup time.

Response: MDHES received information from Mycotech, a white rot fungus company in Butte, which indicated time for treatment of soils may be reduced by using their technology. Detailed design studies will refine the bioremediation design in the next phase of the project.

Comment 5: MCLs in Silver Bow Creek must be met.

Response: The selected remedy specifies MCLs and aquatic criteria that must be met in Silver Bow Creek.

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Comment 6: Should honor historic (residential) use of the site. Cleanup must not be driven by zoning provision changes that benefit the PRP.

Response: The agencies have determined that land use restrictions will likely be implemented at the site by the PRPs and Butte-Silver Bow. This has been considered for setting cleanup levels and points of compliance. The Record of Decision contains a contingency that, if these permanent restrictions are not put into place, cleanup levels and points of compliance will revert to ones appropriate for land and groundwater uses allowed under current law.

Comment 7: To what extent have the agencies identified Montana Pole contaminants downstream throughout the Silver Bow Creek site?

Response: Surface water and sediment are being sampled for Montana Pole related contaminants under the Silver Bow Creek-Streamside Tailings and Rocker Operable Unit remedial investigations. The complete reports of these sampling efforts are not yet available although it is known that PCP has been detected in surface water at and below the Rocker site (7 miles downstream of the Montana Pole site).

Comment 8: ARCO's preferred Alternative 3 does not meet the requirement of permanence as required by law.

Response: MDHES does not believe that Alternative 3 provides the degree of permanence that the selected alternative does.

Comment 9: Funding and guaranteeing long-term O&M is uncertain and very risky and an unacceptable course.

Response: MDHES agrees that funding for long-term operations and maintenance is very expensive and difficult to guarantee. See Section 2.6.

Comment 10: Because there is a great deal of water movement beneath the site (annual groundwater fluctuation of about 2 feet), ARCO's statement that there can be stability of contaminants under their capping alternative is misleading.

Response: Alternative 3 called for capping source areas which would reduce precipitation from infiltrating and carrying contamination into the groundwater. Capping would not mitigate source areas in contact with the groundwater. It was assumed under this alternative that physical and hydraulic barriers would minimize migration of contamination and reduce releases to Silver Bow Creek to allowable levels.

Comment 11: Thirty year costs are not realistic. Urges using 200, 500 or 1,000 year costs.

Response: MDHES has evaluated the consequences of long-term costs. See Section 2.6.

5.7 Comments from Dr. John W. Ray, Butte, Montana

[some comments similar to ones given at public hearing and not repeated here]

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Comment 1: Alternative 5B most closely meets the nine criteria for cleanup plan evaluation.
Response: MDHES agrees, and the selected remedy most closely resembles Alternative 5B.

5.8 Comments from Mary Boone, Butte, Montana

Comment 1: Wants all contamination taken out and destroyed.

Response: The selected alternative removes and treats the maximum amount of contamination practicable.

Comment 2: Supports option 5B

Response: MDHES recognizes Ms. Boone's support for the preferred alternative.

Comment 3: Wants contamination under the highway removed.

Response: The selected alternative calls for soil flushing of the area beneath the interstate to remove contaminants followed by in place bioremediation of remaining contamination. This remedy will remove much of the contamination under the highway and is thought by the agencies to be the appropriate remedy for this area.

5.9 Comments from Kim Bray, Cindy Hendricks, Ellen Kelly, Butte, Montana

Comment 1: Recommend total excavation and groundwater freezing to skim LNAPL product. Believe freezing of smear zone would avoid potential problems of excavation in the groundwater.

Response: Excavation will be designed, engineered and implemented to remove the maximum amount of contamination practicable in a cost effective manner. The agencies will encourage whoever implements the remedy to look at innovative methodologies.

5.10 Comments from Donald Ritter, Butte, Montana

Comment 1: Agrees with the state's proposed plan 5B. Opposed to the ARCO plan.

Response: MDHES recognizes Mr. Ritter's support for the preferred alternative and opposition to the ARCO plan.

5.11 Comments from Mrs. Nicki Leiss, Anaconda, Montana

Comment 1: Disagrees with the state's plan, agrees with ARCO plan.

Response: MDHES recognizes Ms. Leiss' disagreement with the preferred alternative and support for the ARCO plan.

Comment 2: Excavation below water table will spread contamination.

Response: There has been no technical information submitted to support this claim. See

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response to Comments 4, 12 and 16, Section 3.3.

5.12 Comments from Joe Boyle, Butte, Montana

Comment 1: Should excavate the pole plant. We don't want to rely on a pumping plant that must operate longer than the history of man.

Response: The selected alternative requires excavation to the extent practicable of source materials from all accessible areas of the site.

5.13 Comments from Richard Maney, Butte, Montana

Comment 1: Strongly urge the state to excavate and treat the maximum amount of the pollutants. Supports Alternative 5B.

Response: The selected alternative requires excavation to the extent practicable of source materials from all accessible areas of the site. MDHES recognizes Mr. Maney's support for the preferred alternative.

Comment 2: Wants the highway bridge removed to access the remaining contamination.

Response: The selected alternative calls for soil flushing of the area beneath the interstate to remove contaminants followed by in place bioremediation of remaining contamination. This remedy will remove much of the contamination under the highway and is thought by the agencies to be the appropriate remedy for this area.

5.14 Comments from Tony Veazey, Missoula Montana, submitted to ARCO and transmitted to MDHES

Comment 1: Unreasonable to establish an objective of drinking quality water at the site while threats of contamination from the Berkeley pit and other sources remain.

Response: Groundwater in the immediate vicinity of the Montana Pole site is presently of drinking quality and is being utilized for drinking and lawn watering. Although groundwater in the vicinity of the site may be "threatened" by other contaminant sources such as the Berkeley pit, this does not preclude taking appropriate cleanup action at this site. Also see Section 2.1.

Comment 2: Agrees with ARCO that excavation below the water table appears to be neither efficient nor cost effective.

Response: MDHES believes that excavation to the extent practicable of accessible source areas can be done efficiently and in a cost effective manner. Also see Sections 2.4 and 2.6.

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6.0 RESPONSE TO COMMENTS RECEIVED AFTER THE CLOSE OF THE COMMENT PERIOD

The following are responses to comments found in Appendix D.

6.1 Comments from Mr. Edwin Rosenkranz, Missoula Montana

Comment 1: Supports the State's plan and opposes ARCO's.

Response: MDHES recognizes Mr. Rosenkranz' support for the preferred alternative.

6.2 Comments from Sue Gassenberg, Butte, Montana

Comment 1: The maximum amount of contamination must be removed including removing the highway to get at that contamination.

Response: The selected alternative calls for removal of source material to the maximum extent practicable. Soil flushing beneath the interstate to remove contaminants followed by in place bioremediation of remaining contamination will remove much of the contamination under the highway and is thought by the agencies to be the appropriate remedy for this area.

6.2 Comments from Mary Kay Craig, Clark Fork Pend Oreille Coalition

[The commenter reiterated some comments previously submitted]

Comment 1: The preferred remedy is implementable. The commenter provides a discussion about excavation at the site including notes from CTEC meeting and a statement submitted to the Butte-Silver Bow Council of Commissioners.

Response: MDHES agrees that the preferred alternative is implementable and has considered the other information the commenter submitted.

6.3 Comments from Sandy Stash, ARCO

Comment 1: ARCO submitted additional cost information relative to the FS and the preferred alternative. The information included recalculation of present worth values using a 5 percent discount rate.

Response: MDHES has considered this information in the decision making process.

6.4 Comments from the PRP group of ARCO, BN and Inland et al.

Comment 1: The PRPs proposed a variation of Alternative 4B, which provided for excavation and treatment of source material, in-situ treatment of soils and groundwater and other suggestions as well. Under the proposal, contaminated soils would be excavated to a depth slightly above the water table. This would provide access to contamination at and

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below the water table which would be tilled and biologically treated in-place.

Response: The agencies believe that the PRPs' suggestions indicate a constructive approach toward achieving cleanup at the site. In response, the agencies believe that the selected remedy as outlined in the ROD provides sufficient flexibility to incorporate some of the constructive suggestions made by the PRPs, if appropriate. For example, contaminated materials and LNAPL will be excavated only to the extent practicable as determined by the agencies. If in-situ treatment of the contaminated soils below the groundwater table proves more practicable and effective than excavation, such treatment can be incorporated in the design of the remedy. In addition, the ROD recognizes the probable adoption of institutional controls sufficient to prevent any drinking water use of the groundwater at the site. Accordingly, the points of compliance for the drinking water ARARs have been moved out to the waste management unit boundary. The agencies believe these modifications are responsive to the constructive suggestion made by the PRPs and look forward to cooperative implementation of the selected remedy.

6.5 Comments from Liz Gupton, Missoula, Montana

Comment 1: Supports the preferred alternative.

Response: MDHES recognizes Ms. Gupton's support for the preferred alternative.

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APPENDIX A

Comments Received at the Public Hearing



CANDI NORDHAGEN
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STATE OF MONTANA
DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

MONTANA POLE SUPERFUND SITE
Public Hearing
Tuesday, May 25, 1993

TRANSCRIPT OF PROCEEDINGS
Taken at
Butte Community Center
25 West Front Street
Butte, Montana
7 p.m.

HEARINGS OFFICER BILL KIRLEY, presiding

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BE IT REMEMBERED THAT this matter came on for public hearing on Tuesday, May 25, 1993, in the Butte Community Center.

The following proceedings were had:

MS. HEATH: I think we're ready to begin. I want to welcome everybody here tonight and thank you for coming. This is a fantastic turnout. I'm really pleased to see so many people. My name is Jane Heath. I'm a public information officer with the Montana Department of Health and Environmental Sciences with the Superfund Program.

The reason we're here tonight is to discuss the proposed remedy for the Montana Pole Site, but even more importantly, to hear you folks discuss cleanup for the Montana Pole Site. We're here to listen to your comments. We'll start off the meeting tonight with sort of an introduction about the site and a background by Brian Antonioli, our site project manager for the site, and then we'll do some question-and-answer time. And then after

that, we're going to take a short break for our court reporter and so that we can get set up for the hearing, and then we'll actually begin the hearing.

Now, once the hearing begins tonight, there

won't be any more time for questions and answers. There will be no cross-examination of the people who are giving comments. So if you do have questions you want to ask, by all means please do ask those during the question-and-answer session.

Bill Kirley is our attorney for the Superfund Program and he will be the hearings officer tonight. We'll introduce a few other folks that are here with us. Karen Zachheim is the Superfund Program coordinator with the State Health Department. Don Pizzini is the Superfund manager -- is that the right title?

MR. PIZZINI: That's good enough.

MS. HEATH: -- with EPA. And Ron Bertram is the program manager with EPA. I want to mention that we extended the public comment period. It was originally due to end June 7. We've had two requests so far for extension of that comment period so we will be extending it another 30 days, until July 7th.

I'd like to note right now that you don't have to give oral comments tonight to get your comments on the record. We sure encourage you to do it that way, but if you feel better putting them in writing, we have envelopes you can pick up on your way out. They're postage-paid and they'll get right to us. Or you can actually call us up at our 800 number. We have an answering machine that's on

that line specifically, so if you call through our other regular number, we'll have to ask you to call back through the 800 line and we'll tape-record your comments.

We have a court reporter here tonight, Candi Nordhagen, from here in Butte. She'll be transcribing the entire meeting. I'd like you all, when you give comments or ask questions, to please speak very clearly, loudly and slowly. If she has any trouble hearing you, she will stop you. The main point is we want to be very accurate in getting down exactly what you say tonight. It's very important to us.

We have a sign-up sheet up in front here for the hearing. If you're going to give comments tonight, please put your name on this either sometime during the meeting or during the break before we start the hearing and then we'll go through this in order. I sure encourage all of you folks to give comments. Public comment really does make a great deal of difference to us. I think a really good example of that is the Warm Springs Ponds. We put out a feasibility study back in I believe it was 1989 and we did end up ultimately changing the remedy very much because of the public comment that we received on that.

We have coffee and cookies in the back. Please help yourself at any point. And at this point, I'll turn it over to Brian Antonioli.

MR. ANTONIOLI: Thanks, Jane. A couple of things I'll just mention, a few of the other folks involved in the project: Sandy Stash from ARCO and Phyllis Flack from ARCO. They're our counterparts at ARCO that have been working on this project for the last couple of years. At the table I know ARCO put up a couple of handouts on the table. If you didn't get them, if you came in before they put those up there, they are up here.

CTEC, the local citizens group that's involved in the Montana Pole Site, had a handout up here. I noticed it ran out. I don't know if there were more copies of that or not. If you want a copy of that, you can contact John Ray in the back or Bill McGregor for the CTEC group. Also there are copies of the Proposed Plan and Agenda. If you're looking for those, they are up here at the table. Does anyone want one? I can give them to you.

The first part of the meeting here, we're just going to be as brief as we can, go over a little bit about the site and the history of the site, kind of the process that's led up to the hearing and where we're going from here. The Montana Pole Site, there's a couple of figures up here that show it. If folks are familiar with it, it's located down by the Montana Street exit on the interstate. That would be right about here is Interstate 90 -- (points

to figure.)

The facility operated from about 1946 through about 1984. They treated poles and posts with wood-treated preservatives. And the preservative they used there was a compound called "pentachlorophenol". Pentachlorophenol is a pesticide. It was mixed with a carrier oil, petroleum oil, and used for dipping those poles in and pressure treating poles and things like that at the site.

In 1983, a citizen noticed that down along Silver Bow Creek, there was oil seeping into the creek, there was an oil slick out on the creek, notified the Health Department and the local officials and the EPA. And subsequent to that, EPA came in and because there was oil leaking into the creek, they performed some emergency actions at the site to try to contain that oil. The wood-treating plant went out of business, then, in 1984 and it's been being investigated and studied since then, and we're going to the point now where the agencies are going to make a decision on what to do with the site, what we're going to do to clean it up. And that's what this meeting is all about.

I should tell you briefly what EPA did in the mid-Eighties. They came in and dug up a lot of contaminated soils and they installed a groundwater system

to extract a lot of wood-treating fluids that were down in the groundwater and getting out into Silver Bow Creek. Now in 1990, the State Health Department and ARCO entered

into an agreement whereby ARCO agreed to investigate the site, investigate the contamination at the site in what's called "a remedial investigation," and also perform a feasibility study which would outline feasible alternatives for dealing with the site, for treating the contaminants at the site.

What we found there is documented in these reports over here, I'll just direct your attention -- (points to documents.) That process basically boiled down to a Remedial Investigation Report, just a three-volume report; Feasibility Study Report, one volume. And those are final reports. They're located in the libraries here in town - at the Tech library, and up at Butte Public Library - and of course in our offices, EPA offices.

There's also another couple of reports I'd bring your attention to. One is called the "Risk Assessment Report". And that was a report that the State Health Department contracted to a risk contractor to determine what the risk from the contaminants were at the site. And also there is a report here called the "Position Paper on the RI/FS Report" and that's a submittal that ARCO gave us. It basically outlined a lot of the disagreements that

they had with the Health Department while we were finalizing those reports. And I will tell you there weren't a lot of disagreements between ARCO and the Health Department on those reports.

Anyway, those are the main reports that we're asking for comments on during this public comment period, although we're asking for comments on the whole administrative records, which is about a four file cabinet record located up at the library. And to condense all that information into a fifteen-minute public meeting would be pretty impossible, so we're just going to kind of hit the highlights tonight, the main points. But I would encourage anybody who has the time, to review those reports. That's the real crux of the whole process, and those really have the critical information in them.

What we found at the site during the investigations was essentially contamination in soils at the site and in the groundwater. And this figure here shows the contamination in the soils at the site -- (points to figure.) And I know it might be hard for you in the back to see, but basically on this figure, what we found was there were areas of the site where contamination had just gotten into the surface soil and not penetrated any deeper. And those parts are marked in purple. And then there's an area of the site where there were heavy

spills of contamination, the wood-treating product. And those areas are marked in orange, and those are areas where the contamination was found all the way from the surface down to the groundwater table.

In addition at the site, we delineated a layer of floating wood-treating product that after this product had been spilled up at the site and it migrated down

through the soil, it got to the groundwater table, which is down approximately ten feet on average at the site, and then it floated on top of the groundwater table. And this area is marked out in this green plume, and that's where this floating wood-treating oil is found. In some areas of the site, we found it in the monitoring wells up to 2.5 feet deep.

This wood-treating product had been spilled up in the main process area and along a drainage ditch that ran down to the Silver Bow Creek and then spread all the way to the Silver Bow Creek, and that's how it was getting into the creek. It was seeping out where that groundwater was coming into the creek. So that's what we've determined during the RI/FS on the soils at the site.

In addition, these wood-treating products that are in the soils and in the oil floating on top of the groundwater are contaminating the groundwater at the site. What we felt was the main source of contamination at the

site was actually this floating layer of wood-treating product.

And on this other figure - (points to figure) - it's a little harder to see, but what you have is the area where that wood-treating product is found on top of the groundwater table and then you have a plume of contaminated groundwater that surrounds that, that this wood-treating product and the PCP is dissolved in the groundwater and it's spread out, has moved down to Silver Bow Creek and is actually found in Silver Bow Creek and near Silver Bow Creek down for a long ways.

We studied it just to where it crosses the highway here - (points to figure) - but the PCP in the creek is found down past Rocker, further on downstream at relatively high levels. The groundwater is the main problem at the site. The groundwater getting into the creek is a release of contamination that we feel really needs to be addressed at the site. What we found is that the levels in the creek are above the drinking water standard and they are above standards for aquatic life, i.e., for fish.

The whole idea here at Silver Bow Creek with the cleanups going on in the Butte area is to try to clean up this creek so that at some time, it might have a viable fishery in the creek. So looking at that aspect of it,

these releases into Silver Bow Creek are something that definitely has to be addressed at the site. Those releases have to be stopped.

The Feasibility Study, in that report, what we do is we look at the contamination as it existed at the site and try to outline a range of alternatives. Those alternatives are in the proposed plan - I don't know if you've had a chance to look at it - but they range from doing nothing, which is the no-action alternative, just leaving things as they are right now, and then through different levels of cleanup.

Alternative 1, which is the no-action alternative, leaves things pretty well the way they are; Alternative 2 just implements the institutional controls, which is like zoning and well bans and things like that, to keep people from coming in contact with contamination.

Alternative 3 is really the first alternative of the five alternatives we looked at that addressed these releases. And that's one of these nine criteria - (points to chart) - protection of human health and environment. As it is right now, the environment is not being protected because these releases are constantly occurring in the creek. So in order to accomplish that first criteria, Alternative 3 looks at the groundwater containment system that would be installed on the downgradient side of this

plume - (points to figure) - to contain that groundwater and keep it from getting into the creek. It would keep the oil from getting into the creek, it would keep the groundwater from getting into the creek. And that's the main objective of Alternative 3 is to do that, and it accomplishes that through a system that would be installed at the site.

In addition, Alternative 3 looks at treating some of the soils that have been removed previously by EPA at the site. There's oils that are stored on site in big tanks; that would be cleaned up. There's some debris and some equipment that are on site; that would be cleaned up. But for the most part, Alternative 3 contains the groundwater; and in addition to that, it puts a cap over this contaminated soil, caps this contaminated soil so that people don't come in contact with the soil at the site. That's the essence of Alternative 3.

Alternative 4 really looks at trying to remove some of the source. It goes about halfway. Under Alternative 4 this area in orange would be excavated down to the groundwater table, including this layer at the groundwater table, this floating oil layer. That would be removed, too. In addition, these areas in purple would be removed and they would be treated. We had a number of different treatment options: Incineration was one,

incinerate those soils; soil washing, we looked at, which is a water process where you wash the soil and it removes contaminants; and biological treatment, which is a process where you enhance bacterial action and allow the bacteria to break down the PCP in the soil.

Alternative 5 really looks at the maximum effort that we thought was feasible for the site. What that was, was essentially excavate all the source areas, which is all these areas that are marked here except for under the interstate. The interstate highway runs right across here and it was thought in the Feasibility Study that that was not a feasible thing to do, to dig up the interstate.

So under Alternative 5, all of these other areas would be dug up and those soils would be treated. And in that process of digging that stuff up, the oil would be

16 recovered that's floating on top of the groundwater, the
17 major soil sources would be recovered, and those soils
18 would be treated biologically up on the surface, somewhere
19 up on the surface in this area -- (points to figure). And
20 after they were treated to meet cleanup levels, acceptable
21 cleanup levels, they would be returned back into the
22 excavation areas. That's what we're proposing for the
23 site is that Alternative 5.

24 Now, I should also mention that both Alternative
25 4 and 5 have this groundwater containment system that I

1 outlined for Alternative 3. So all of those alternatives
2 have those containment systems to keep contamination out
3 of the creek. Because even under Alternative 5, it's
4 going to take a few years for you to get the
5 contamination, No. 1, to excavate and treat it. ARCO
6 estimated it would take about 11 years to treat that stuff
7 biologically. So during that time, you want to have a
8 groundwater system in place to keep the contamination out
9 of the creek.

10 And No. 2, there is an area of the site right
11 here - (points to figure) - under the interstate which
12 would be left in place and would continually be a source
13 and you would need a groundwater system in there to treat
14 that. Under Alternative 5, the alternative that we're
15 proposing, this area underneath the interstate, we
16 wouldn't just leave it, we would try to treat it as best
17 we could without excavating, which is essentially flushing
18 the oil that's floating under there, flushing that oil out
19 as best we can, and then after that, having what they call
20 in situ bioremediation; which is, you enhance the
21 biological action in that area underneath the interstate
22 to enhance the bacteria to break down the contaminants.

23 So we would do the best we could, although
24 that's not nearly as good as excavating and treating it,
25 because you can't get to it. You can't get 100 percent of

1 it treating it that way, but that would be about the best
2 we could without digging it up.

3 That's kind of the range of alternatives that we
4 looked at for the site. I guess what I'd like to do is
5 just talk a little bit about the preferred remedy and a
6 little bit about the nine criteria over there -- (points
7 to chart). Where we're coming in right now is on this
8 No. 9 down here, community acceptance. We've proposed
9 this remedy.

10 Community acceptance is one of the nine criteria
11 and we need your feedback on not only the remedy that
12 we've proposed, but the other remedies because we haven't
13 made a decision at the site yet. We could actually select
14 a remedy that was any of those alternatives that are
15 outlined there, any of the five alternatives from no
16 action through No. 5. We could select any of those, or we
17 could modify the one we selected, or we could combine
18 alternatives, depending on what we get back from the
19 public and from the local community and the community

20 leaders, if we receive any other technical information
21 from folks during the public comment period. One thing
22 that we'll be very interested in is hearing from the PRPs
23 as to what their preferred remedy is, what they propose,
24 and what they think should be done in the site, and
25 evaluate that.

1 So we're going to evaluate all that information
2 after the public comment period is over before we write a
3 decision, before we do a decision on the site. And so
4 people need to understand that we're not just asking for
5 comments on the one alternative that we're proposing, but
6 on the whole range of alternatives because it could end up
7 that one of those other ones might be selected depending
8 on the comments received.

9 There's just a couple of things I'd like to
10 point out. I think the Proposed Plan document has a lot
11 of the detailed information in it if you're looking for
12 exactly how we evaluated those nine criteria for each of
13 the alternatives, but I think a couple are important, I
14 know a couple are on people's minds. And one is the cost
15 of these alternatives. And this is just a chart - (points
16 to chart) - that shows the relative costs of the
17 alternatives.

18 The A's, B's, and C's, that was used to
19 designate the type of treatment for the soil. "A" was
20 incineration. Of course you see these tall spikes.
21 Incineration is very, very expensive. Incineration is
22 feasible on small volumes of material but when you have
23 the volumes that we're talking about here at the Montana
24 Pole Site, which is 208,000 cubic yards of contaminated
25 soil, incineration gets very, very expensive. So

1 incineration is "A".

2 "B" was the biological treatment, which is of
3 the three alternatives, three treatment alternatives, is
4 the cheapest between the three. We feel that it can do
5 the job. It can meet cleanup levels that are going to be
6 acceptable, that will protect public health and the
7 environment, and it's the most cost-effective. So we
8 think biological treatment is the way to go.

9 3-C is the soil washing and it was found that
10 there's not a lot of good detailed information on the soil
11 washing, but ARCO felt that its costs were substantially
12 higher than the biological treatment, and it came out as a
13 higher treatment cost than the biological treatment.

14 5-B is the one that we are proposing. In the
15 Feasibility Study, ARCO gave a range of costs which they
16 felt was the minimum to the maximum cost for that
17 alternative. Well, Alternative 5-B, I think it ran from
18 about 27 million to 55 million, in that range. And the
19 average was like 39. And that's what that represents, 39
20 million.

21 I'd like to just talk a little bit about that.
22 That's one of the areas where ARCO and the State disagreed
23 during the Feasibility Study. We didn't feel that some of

the costs that they were presenting were accurate and we had some disagreement on them. It outlines a little bit

of that in their position paper. I think it's an important issue, though. We've looked into things ourselves and we're doing some further cost evaluation during this comment period. And one I would just like to bring to your attention was the costs of excavation at the site. Originally, when we screened alternatives about two years ago for the site, ARCO produced an alternative screening document.

In that document we looked at excavation and excavation in the saturated zone, which is below the groundwater table. And they gave a cost estimate in that document of \$5 per cubic yard and said that it was feasible to excavate, to perform that type of excavation at the site. Well, when the first draft of the Feasibility Study came out, the costs in there for excavation was about \$17 a cubic yard. And although that was higher than the 5, we felt that was within the range of reasonableness. When you look at like Colorado tailings and some of the other major projects in the valley, you look at a lot of \$3 to \$5 cubic yard excavation costs, and we realized some of this was below the groundwater table.

Later in the Feasibility Study process, ARCO felt that it was going to be extremely difficult to excavate down below the groundwater table into that oily

zone at the groundwater. They requested that some higher excavation costs be placed in the Feasibility Study up to \$75 a cubic yard. We don't agree with those figures. We've done some cost estimates on our own and we requested that ARCO use a \$17 cubic yard as the low figure in the Feasibility Study and we think that's still high.

And so there's some technical disagreements there that you'll see. If you have the interest of looking into that, you'll see those sorts of things, and those are the types of disagreements that we ran into in the Feasibility Study.

Another what we think is a very important aspect of cleanup of the site is No. 3 up there, long-term effectiveness and permanence. The whole problem at the site here is that we have a great deal of contamination, a great deal of wood-treating product that's down at the groundwater, floating on top of the groundwater. ARCO mentioned up to 370,000 gallons of product is down there floating on the groundwater table.

Now, you'd think: Well, why can't you just treat that stuff in place, treat in place as best you can? Well, treating in place will extract about between 20 and 50 percent of the contamination. So if you leave it in place, you're going to have at least half of that contamination staying there for the long-term. What that

means is that you'll have to be taking action for the

long-term, essentially forever, to contain that contamination, keep it from migrating, keeping it out of the creek.

That's a critical issue, because like under Alternative 3, although you can install a groundwater containment system that will contain that plume and keep it out of the creek, what you're essentially doing is saying: We're going to buy off on that for the long-term, for the next couple hundred years. At least for the next couple hundred years, that's going to have to be in place, be maintained and operated. You know, what are the consequences of that? Is that an acceptable remedy for the site? There's some tough issues that come in there.

How do you assure that there will be money to maintain and operate that thing 100 years from now? How do you set up a funding mechanism to assure that? I mean it's easy to say that, well, if we could put some money in the bank right now, it would be enough to pay for that thing over the next 200 years, but no bank's going to give you interest rates for more than 30 years. So that's a tough issue. The permanence issue is very tough.

Sure, we think we can design a groundwater system that will contain that stuff and keep it out of the creek, but how are we going to operate and maintain that

thing for the next couple hundred years? That's a tough issue, and I think that's one that we're really grappling with and we don't have all the answers to. But we'd have to have a lot of assurance that that thing would be able to be funded and financed and operated and maintained; or otherwise, 100 years from now the thing will fall apart and it will be back in the creek. And that's something we want to avoid.

So on the permanence issue, the only way to attempt to avoid that is to go after the contamination. If you leave it in place, you're guaranteed you're going to have to babysit the thing for the next couple hundred years. The only way you can avoid that and the only way you can attempt to avoid it is go after contamination and treat it, get it out of the ground. That's what we're proposing. We think that's the best alternative, to go in there, excavate that contamination, get as much out of it we can except for under the interstate. We think we can get over 80 percent, 80 to 90 percent of the contamination out through excavation.

There's some technical disagreements there with ARCO, too. I think they think it's not as easily implementable as that, but we think it is. So that's a critical issue, that permanence issue, trying to avoid something that's going to be there for the next couple

hundred years. How do you do that? Is it cost effective to do that? You know, say we have to spend \$27 million up front to do that. That's a tough issue. The way we evaluated it, we believe that it is the best approach to dig it out of the ground now.

6 There's a couple of other issues there. Under
7 the reduction of toxicity, mobility and volume, if you go
8 into your handout a few pages past the maps, past the nine
9 criteria, there's a chart there that shows the approximate
10 amount, volumes of contamination, percentages of volumes
11 that we get under the different alternatives. And really,
12 the feasible alternatives are 3, 4, and 5. And under 3,
13 you're leaving a lot of contamination; and under 5, you're
14 getting most of it out, although you are leaving some.

15 The other issue here, the reduction of toxicity,
16 we looked at these three treatment technologies:
17 Incineration, soil washing, biotreatment. Incineration is
18 the best thing to do as far as reducing contaminant levels
19 as far as you can reduce them. It is the best technology.
20 Biological treatment and soil washing will not reduce your
21 contaminant levels as well as incineration, but we felt,
22 No. 1, the cost of incineration was too high; No. 2, we
23 thought that biological treatment would be able to get us
24 to acceptable levels, although not the ultimate levels,
25 would be acceptable levels. And so that's kind of the

1 thought process we went through in picking biological
2 treatment.

3 State agency acceptance, the State Health
4 Department was the lead agency during this process. It's
5 a federal site, it's an NPL, National Priority List site.
6 It's one of the top sites in the country. And you can see
7 why it is, because of the massive amounts of contamination
8 out there. Well, the State was the lead agency in the
9 process. And with coordination from the EPA, Sara
10 Weinstock was the project manager from EPA, and the State
11 actually has proposed this remedy and EPA has concurred
12 with this proposed remedy. So in the process, No. 8, -
13 (points to chart) - State agency acceptance, usually EPA
14 is performing the process and the State buys into it or
15 says it's acceptable. We've already said it's acceptable
16 to us.

17 I think that's about all I had on those
18 questions. The one other thing, back on this cost issue,
19 the last page of this handout, the agenda, I'd like to
20 make a point there. ARCO estimated that the costs of
21 operating the groundwater system under Alternative 3, 4,
22 and 5 was between \$500,000 and \$1 million a year. That
23 was their range of costs. So I used the \$500,000 a year
24 and this chart just shows you the annual costs of
25 operating and maintaining that system over the next 200

1 years. I used the inflation factor of 3 percent.

2 And then over on the right, you'll see some
3 figures. The top set of figures is something called
4 "present value" and it says 7 percent there. And you'll
5 see under 100 years, there's 12 million; and under 200
6 years, there's another 12 million. What that means is
7 that if you could put \$12,493,000 in the bank and draw 7
8 percent interest on it, you'd have enough funds to pay for
9 this system over the next 200 years. Okay, that's what

10 that means.

11 The whole Feasibility Study cost evaluation is
12 based on that, it's based on present worth value of money.
13 And although the system itself over 200 years, your total
14 cost, if you sum it up, is \$6 billion; the actual, if you
15 could put it into the bank and get 7 percent, you'd only
16 need 12 million.

17 And so you look at it on that sort of
18 evaluation. Say, well, 12 million isn't that bad an
19 amount of money to put in the bank and that will guarantee
20 that thing for the next 200 years and it's okay. The
21 problem is getting a bank to give you 7 percent over 200
22 years. That's the trouble.

23 If the PRPs or if ARCO or whoever was doing this
24 cleanup, if they were able to fund this in some way that
25 was satisfactory to the State, well then that would be

1 something you would have to consider. But it's hard to
2 determine that. How do you determine that? What fund,
3 what amount of funds right now would be acceptable to the
4 community so that that thing could be funded over the next
5 200 years? It's a tough question. We don't have an
6 answer to it.

7 We are going to consult some economists with the
8 State and down at the universities on this issue because
9 leaving the contamination in place is definitely a viable
10 option at this site, but if we leave it in place, we have
11 to contain it. We have to take care of it. And if there
12 is some way that that's acceptable, we want to look into
13 it and see what all the consequences are.

14 So there's some issues there. We don't have all
15 the answers to them, but there's some definite questions
16 that are raised. That's about all I had on the
17 presentation. If anybody has any questions or answers
18 just on the proposed plan or whatever you wanted to ask
19 about, that's fine, we could go over those right now, and
20 then we'll take a break before the hearing.

21 John?

22 MR. RAY: From an agency perspective, how
23 significant is cost? It's not one of the threshold
24 criteria. It's one of nine.

25 MR. ANTONIOLI: That's right.

1 MR. RAY: In a ranking stream, how significant
2 from the State's perspective is, and I guess the EPA's
3 perspective if they would care to comment, is cost versus
4 things like human health and environment, that kind of
5 thing?

6 MR. ANTONIOLI: Well, you know the criteria are
7 broken up. It's not shown here, but the criteria, these
8 first two criteria are called "threshold criteria" and
9 they are the ones that really are required. They have to
10 be met ultimately. Those are the two that you have to
11 satisfy. The next five are modifying criteria, I think.
12 And the last two are a different criteria, balancing
13 criteria. So really the first two, I think, have a little

14 more priority over things. And then these next ones,
15 which cost is part of, is one of your modifying, balancing
16 criteria. So I don't know if anybody else from EPA or the
17 State may have something to say on that. Cost is
18 definitely a factor, though.

19 MR. PIZZINI: Maybe I ought to make a comment on
20 that because cost has come about to be a very important
21 aspect in remedy determinations, and I think some of the
22 case studies that we have seen would indicate that courts
23 are expecting agencies to make the very best decision they
24 can in cleanup, keeping costs in mind.

25 So I think that while we don't always have to

1 select the lowest cost, we have to be in a position to
2 justify why we pick the remedy that may be higher cost
3 than other remedies that might do a satisfactory job at a
4 lesser cost. So it's not something we can push aside
5 easily. It's something that has to be weighed carefully.

6 It's a lot like implementability. You might
7 design the best remedy in the world, but if you can't get
8 out there on site and implement it, it isn't worth a lot.
9 They kind of look at cost in the same way. So it is an
10 important factor, one that we have to keep in mind, one
11 that we have to be able to justify and show the rationale
12 of why we picked the higher cost remedy than something
13 else that might meet the requirements.

14 MR. ANTONIOLI: I think, too, the community and
15 the State look upon costs fairly critically, too. If
16 there isn't a viable PRP to pay for the cleanup at the
17 site, then the site cleanup is paid out of the fund, the
18 Superfund. And in order to do that, the State has to
19 provide 10 percent matching funds. So out of a \$20
20 million cleanup, the State would have to provide \$2
21 million of matching funds right up front. In addition to
22 that, the State has to provide 100 percent of the O&M into
23 the future, the operations and maintenance costs that you
24 have at the site. So, you know, that plays into how you
25 might look at things.

1 Does the State want to be providing costs,
2 operation and maintenance costs for a long time or would
3 they rather pay a little bit more money up front and do
4 that? Those are some considerations we have to make. And
5 is the community supportive of the State spending that
6 type of money for clean up of this site? That's an
7 important issue.

8 MR. KIRLEY: I'm Bill Kirley with the State. I
9 want to make a point. Since we are trying to make a
10 transcript of this meeting, we're required to do that,
11 anyone who has just a question to ask during this
12 question-and-answer session is free to ask a question. If
13 you want yourself to be identified or if you are giving an
14 answer or responding somehow to somebody else's question,
15 we would ask you to identify yourself so that that will be
16 clear on the transcript of the meeting when it's made. If
17 you're just asking a question, feel free to ask it, and

18 you don't have to give your name if you don't want to.
19 Thank you.

20 MR. ANTONIOLI: That was Don Pizzini earlier
21 that gave that answer.

22 Any other questions?

23 UNIDENTIFIED QUESTIONER: Yes, Brian, when you
24 remove the soil, you're going to create a 10-acre swamp.
25 What are you going to do with that water during the time

1 of removal and after?

2 MR. ANTONIOLI: Water in the swamp?

3 UNIDENTIFIED QUESTIONER: Water in the swamp.

4 MR. ANTONIOLI: That's a good question. As you
5 may know, we haven't designed the cleanup remedy. That is
6 the next step in the process. And so there's aspects of
7 design and implementation of the remedy that haven't been
8 fully thought out or put down on paper. The question he
9 has is what's been envisioned at the site is that you'd
10 start at this upgradient end of the site and you would
11 excavate enough soil to put in your biological treatment
12 units. And this area, and I think ARCO estimated that
13 once a year, that you'd put soil in the land farm under
14 the Feasibility Study, Phyllis?

15 MS. FLACK: We had the 11 years --

16 MR. ANTONIOLI: Eleven years?

17 MS. FLACK: -- to string out the 250,000.

18 MS. STASH: The Feasibility study didn't take
19 into account issues with the removal of the Colorado
20 tailings, so there is a transit, I think as you know, that
21 may be affected by the workload in Area 1.

22 MR. ANTONIOLI: Yes, the first issue is you
23 excavate this material and you excavate down to the
24 groundwater table. Why we've outlined that as part of the
25 remedy is that the main source is at the groundwater

1 table, it's floating oil. If you excavate down to the
2 groundwater table and actually excavate slightly into the
3 groundwater table, what does that do? It creates a pool
4 of water with the oil floating on top of it. We feel that
5 that's a great opportunity to get in there and skim that
6 oil off the top with skimmer pumps.

7 EPA did this in 1985. They installed trenches
8 across the site, dug down to four or five feet below the
9 groundwater table, and had these open trenches and they
10 left open all summer long, and they skimmed the oil off of
11 them all summer long. And we think that's the best
12 approach at the site. True, you're going to have an
13 open body of water for a period of time, like a year,
14 until this soil is treated and you can put it back in the
15 hole. But during that period, you're going to be skimming
16 that oil.

17 And there's some other factors there. You'd
18 probably have to have it fenced, you'd have to have the
19 site controlled so that people couldn't access that area.
20 There's some issues there, but we think that that's
21 implementable, feasible to do. You do have an open body

22 of water, that's true.
 23 Now, the other question?
 24 MS. WEINSTOCK: Also on that, I'm Sara
 25 Weinstock, EPA, something that we've been looking at like

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1 Brian says, we have not got into the design phase. We
 2 have 10,000 cubic yards of contaminated soil in those
 3 barns. There's a potential as we dig out, we could first
 4 treat the soil in the barns, clean it up, dig out a
 5 section, place the clean soil in that section, and move
 6 down the site. Now, this would take some sheet piling and
 7 some other engineering plans. It's not, as I said, in the
 8 design phase, but there are some options there that we are
 9 looking at and will be looking at in the design phase.

10 MR. ANTONIOLI: Yeah, what Sara said.

11 Was there another part of your question?

12 UNIDENTIFIED QUESTIONER: No.

13 MR. ANTONIOLI: Any other questions?

14 UNIDENTIFIED QUESTIONER: How is the groundwater
 15 going to be treated?

16 MR. ANTONIOLI: How is it going to be treated?

17 UNIDENTIFIED QUESTIONER: Yes.

18 MR. ANTONIOLI: I guess that's something I
 19 neglected a little bit. EPA came in this last year and
 20 installed a groundwater treatment plant at the site
 21 because oil was still getting into the creek. And it's
 22 shown here on this map. They installed a wall that goes
 23 down into the groundwater table. It's called a
 24 "Gundwall," it's a sheet piling. And what it does it goes
 25 down below the layer of oil so it stops the layer of oil

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1 from moving. That's this line right here -- (indicating.)

2 Then they installed these wells. These are
 3 extraction wells. What they are doing out at the site
 4 right now is they're pumping out oil and water out of the
 5 ground. The oil, they are storing in the tank; and the
 6 water, they're running through a treatment plant shown
 7 about here is this approximate location -- (indicating.)

8 The treatment plant, what it does is it runs the
 9 water through activated carbon. Activated carbon is a
 10 very good mechanism for removing organic contaminants out
 11 of water. And as it is right now, EPA is pumping about
 12 100 gallons per minute of water - 150 gallons per minute
 13 of water and they are treating it through these large
 14 tanks of carbon and then they are discharging the water
 15 down into Silver Bow Creek. That water, from what EPA has
 16 told us, is reaching levels below the drinking water
 17 standard, so it's clean enough to drink as far as the
 18 organic contamination.

19 That's basically a type of groundwater treatment
 20 that you can use. And basically, what we've proposed in
 21 the Proposed Plan is that we'd utilize that system since
 22 it's already built out there, we can utilize it, we can
 23 add on to it, and use that activated carbon treatment
 24 system in the final groundwater treatment plant for the
 25 site.

34

1 MR. KIRLEY: You'd also have some in situ bio as
 2 well.

3 MR. ANTONIOLI: I should mention that, too. The
 4 proposed alternative, what it also contemplates is after
 5 you've removed this soil contamination, you do some
 6 biological treatment down in the groundwater, too, because
 7 the soil essentially gets rid of the source but you still
 8 have this huge pool of contaminated groundwater and you're
 9 pumping it around a little bit. But a very good method
 10 for treating that groundwater down in the ground is in
 11 situ bioremediation, which is essentially introduce
 12 bacteria and oxygen and nutrients down into the
 13 groundwater and that promotes biological breakdown of
 14 those contaminants. And that's another aspect of the
 15 groundwater treatment. Albert?

16 MR. MOLIGNONI: How much product are you
 17 collecting right now with the treating plant?

18 MS. WEINSTOCK: Approximately 50 gallons a day.

19 MR. ANTONIOLI: 50 gallons a day. Through EPA's
 20 actions at the site since about 1985, we collected over
 21 20,000 gallons of oil.

22 MS. WEINSTOCK: About 30,000.

23 MR. ANTONIOLI: About 30,000 to date. That was
 24 Albert Mollignoni.

25 MR. MOLIGNONI: Does activated carbon filter

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1 take the PCPs out of the water, too? Aren't they floating
 2 on the water or are they dissolved in the water?

3 MR. ANTONIOLI: They are dissolved in the water.
 4 How the system works right now is you've got the floating
 5 oil and you've got the dissolved water. And there's one
 6 pump that's extracting dissolved water. It's down here a
 7 few feet and it's pulling out the water and actually
 8 pulling the water table down a little bit to cause the oil
 9 to flow into this well. And then you have another pump up
 10 on top that's just pumping oil out. So the oil pump is
 11 just pumping oil and the water pump is just pumping water.
 12 The water has dissolved contamination. I don't know if it
 13 has any product in it at all. That's what it's extracting
 14 is this dissolved PCP.

15 MR. MOLIGNONI: What are the drinking water
 16 standards for PCP and what are the amount of PCP in the
 17 water now for Montana Pole Plant?

18 MS. WEINSTOCK: In the dissolved phase coming
 19 into the water treatment plant, we have about 2 to 5 parts
 20 per million of PCP coming into the plant. We're treating
 21 -- the drinking water standard is one part per billion.
 22 Our analytical results indicate that there's less than one
 23 part per billion being discharged into the creek. We're
 24 very close to detection limit there, but we're less than 1
 25 part per billion.

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1 MR. MOLIGNONI: Can you tell me what the cancer
 2 risk is with that amount at the Montana Pole Plant?

3 MR. ANTONIOLI: Well, the MCL, the Maximum

Contaminant Level, of the drinking water standard is one microgram per liter, one part per billion. That level is based on an analysis, a drinking water analysis that looks at about a one in a million additional cancer risk for drinking that water, I believe. It's about a one in a million additional cancer risk.

MR. MOLIGNONI: If you drank the water that's there now with that amount that's in there, what would the cancer risk be? That's my question.

MR. ANTONIOLI: Well, in our risk assessment, when we looked at that, our numbers were very, very high, about a 1-in-10 chance of getting cancer because the levels are so very, very high. It's saturated, a lot of that water is saturated with PCP.

MR. MOLIGNONI: Thank you.

MR. ANTONIOLI: So it's way up there, one in ten or so.

UNIDENTIFIED QUESTIONER: Has the creek been sampled since the new water system has been put in? I'm curious to know what the level of concentrations in the creek are as compared to what is showing up in the water treatment plant.

MR. ANTONIOLI: The RI that ARCO conducted sampled up through 1991. We sampled 1990 and 1991. Since then ARCO has done some sampling at the site, although we haven't received their analyses. They have done sampling in the creek both upstream at the site and downstream of the site. Maybe Sandy or Phyllis would address that about sampling results.

Have sampling results from the creek been collected recently by ARCO?

MS. STASH: As you're aware, that's data that's been collected under litigation and is attorney-client privilege.

MR. ANTONIOLI: That data is not available so we don't have any available data today over the last year.

MS. WEINSTOCK: One of the problems with the creek at this time, we still have two seeps into the creek. They are very minimal. Since we put the Gundwall in, the seeps have almost stopped. The reason the seeps have not completely stopped is we have contaminated soil between our Gundwall and the creek. It ranges from 20 feet to 50 feet wide running between the Gundwall and the creek.

And so the soils near the creek, between the Gundwall and the creek, need to be excavated to stop those seeps. And then you'll see, you know, a drop in PCP in

the creek from that. That doesn't stop the dissolved phase from getting into the creek, but it will stop the pentachlorophenol from the seeps getting into the creek.

MR. ANTONIOLI: It would be nice to know what effects this system has had in its current activities that EPA has taken, but the one thing about the system they have installed, it does not prevent the dissolved

contamination, this groundwater, from just going into the creek. It only stops the oil. It stops the oil but we don't know how well it stops the groundwater.

MS. WEINSTOCK: EPA will have some of that data in two weeks available for the public. So anybody that's interested in looking at that data, we'll make it available to you at that time.

MR. ANTONIOLI: Bill?

UNIDENTIFIED QUESTIONER: Brian, on the products that are currently on the site, what is EPA - Montana State's scheduling to get that material off the site and processed and taken care of?

MR. ANTONIOLI: Our 30,000 gallons of oil?

UNIDENTIFIED QUESTIONER: Yes.

MR. ANTONIOLI: The 30,000 gallons of oil, what we've proposed in the Proposed Plan is to ship that off site to a licensed incinerator. The closest one is probably in Utah that would take that material. Right now

that incinerator, they are going through their final licensing and we don't know when they'd be able to accept that material. But that material could be shipped off as soon as an incinerator was available to take it. We haven't scheduled that, we haven't looked at that, but that's something that we could easily deal with, and that material could be disposed of before any of the other excavation or anything else happened. That's something that could happen right away. We haven't scheduled it.

UNIDENTIFIED QUESTIONER: The rest of it would follow the same process?

MR. ANTONIOLI: It would follow the process of the excavation and all that, but the oil up on top, and we think like the equipment and debris that could be decontaminated and sent to a landfill, that stuff we can deal with relatively quickly, get that out of there. I would like to see that stuff moved out by next summer. I don't know if we're going to see anything done this summer, though, except for EPA's removal activities that are ongoing. I hope to see that by next summer we get rid of the oils, sludges, and also the equipment and debris, start working on that.

UNIDENTIFIED QUESTIONER: Again, is that down there protected enough that we don't have any vandalism or anything like that?

MR. ANTONIOLI: It's all within the fenced-off area, it has spill protection underneath it. We think it's in pretty good shape down there.

MR. RILEY: I'd like to make a couple of comments. I was at your meeting last December. I worked at the Pole Plant in '64, '65, and '66. The gentleman asked what's the contamination on the PCP. You said it has a possibility to cause cancer?

MR. ANTONIOLI: Yes.

MR. RILEY: What is your -- just your proposed cleanup is for the environment of the community, to make

12 it better for the environment?
 13 MR. ANTONIOLI: Yes.
 14 MR. RILEY: What is your proposed guidelines?
 15 If the contaminants that are left has a potential of
 16 causing cancer, then what about the workers that worked
 17 there?

18 MR. ANTONIOLI: I know you've raised this issue
 19 at the last meeting. The RI/FS process and the Superfund
 20 cleanup process, what it looks at is the site as it is
 21 right now and into the future. Health concerns of past
 22 workers and people that may be exposed to those
 23 contaminants in the past is not dealt with through the
 24 Superfund process.

25 What's the best route for people to go through

1 the agency for toxic substances and disease registry?

2 MS. HEATH: OSHA.

3 MR. ANTONIOLI: From what I understand, OSHA is
 4 the agency to contact.

5 MR. RILEY: I was logging at the time of the
 6 accident. there were power poles and fenceposts that were
 7 put through there. For years they ran what they called a
 8 "cooker". It was 40 feet long. They pushed trucks with
 9 railroad ties, items to be treated. They pushed them in
 10 the pressure cooker and they cook like you cook on the
 11 stove, and they had little chains that hooked them up and
 12 sometimes the chain would fall off, and as a laborer, you
 13 had to go in. It is highly concentrated and I question if
 14 now this concerns the environment, and what about those of
 15 us that worked there?

16 MR. ANTONIOLI: I believe you have a real
 17 concern there, a valid concern. I don't know what the
 18 best approach is, though. As far as getting some of your
 19 questions answered, it says here on Proposed Plan on page
 20 3:

21 "Montana Pole operated as a wood-treating
 22 facility from 1946 to 1984. During most of this period, a
 23 solution of about five percent pentachlorophenol (PCP)
 24 mixed with petroleum (diesel) was used to preserve poles,
 25 posts and bridge timbers. The PCP solution was applied to

1 wood products in butt vats and pressure cylinders
 2 (retorts). Creosote was used as a wood preservative for a
 3 brief period in 1969."

4 MR. RILEY: I was wondering: What was your
 5 proposal for the PCP? I worked there and if you got a
 6 creosote sliver, your hand would swell up double the size.
 7 And the PCP at that point was in poles. The selling point
 8 was that they could rub against it and it wouldn't hurt
 9 the cows and they could actually use it as a salt lick.
 10 They said it was safe for the animals. And if there's a
 11 concern that there's cancer, then I had the highest
 12 concentrate there was. You would go in there 20 feet.
 13 They have a safety line in case you pass out. You go in
 14 there to hook up the link and then you'd come out and you
 15 couldn't breathe for an hour. That was 40 years ago, '54,

16 40 years ago, if it's cancer-causing, then what about us
 17 that worked there? You have to look at that issue as much
 18 as this other issue.

19 MR. ANTONIOLI: I appreciate your comments.

20 MR. RILEY: If you don't look at it, then we all
 21 that was in there, there's a lot of guys that worked out
 22 in the yard. I don't see anybody else that worked there.
 23 Maybe everybody's died off. If there's contamination now,
 24 then those of us who worked there, it has to be looked at

25 UNIDENTIFIED QUESTIONER: They've been out of

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1 the PCP for years. Now where are you getting it from now
 2 that it keeps seeping down in there? Did you say you're
 3 pulling 50 gallons an hour?

4 MR. ANTONIOLI: Fifty gallons a day, it's down
 5 on top of the groundwater table. It's floating on the
 6 groundwater. About 300,000 gallons are in the ground
 7 flowing on top of the groundwater.

8 UNIDENTIFIED QUESTIONER: Now, are you pumping
 9 pure oil liquids?

10 MR. ANTONIOLI: Pure oil liquids running -- some
 11 of the oils ran between two and four percent. So they are
 12 highly concentrated.

13 UNIDENTIFIED QUESTIONER: This is 30,000 gallons
 14 pumped in this time or you're going to pump?

15 MR. ANTONIOLI: Well, the estimate is how much
 16 was in there was about 300,000. What we've pumped out of
 17 the ground to date since 1985 is about 30,000 gallons and
 18 we have it in big tanks down there on site, thirty
 19 thousand gallons we pumped out of the ground.

20 UNIDENTIFIED QUESTIONER: What concerns me, why
 21 are you still getting that oil after all these years?

22 MR. ANTONIOLI: There's a lot still down in
 23 there.

24 UNIDENTIFIED QUESTIONER: Is that in one small
 25 area or in a big area?

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1 MR. ANTONIOLI: Well, it's in this area right
 2 here - (points to figure.) This is the area where that oil
 3 is found. It's a pretty big area. It's about 500 feet by
 4 1,000 feet long.

5 UNIDENTIFIED QUESTIONER: Don't you think maybe
 6 that oil is coming from someplace else in this length of
 7 time?

8 MR. ANTONIOLI: Well, we've looked at that,
 9 we've drilled monitoring wells all the way around this
 10 thing. In fact if you'll ask ARCO, they didn't appreciate
 11 drilling so many monitoring wells, but we drilled
 12 monitoring wells all around that thing and there's no
 13 other oil coming from anywhere else. We've got it
 14 surrounded.

15 UNIDENTIFIED QUESTIONER: What's being done with
 16 the spent carbon from the treatment plant?

17 MS. WEINSTOCK: In fact today we're changing out
 18 our carbon at the plant. The life expectancy on that
 19 carbon is running about four months. We have a contract

20 with Calgon. They come in and they use vacuum trucks and
21 suck the spent carbon out, recharge our carbon filters,
22 and they take that carbon to Pennsylvania where it is
23 cleaned up, recharged. So we have a contract with them
24 and they'll just come in and do that on a needed basis.
25 We sample that carbon continuously to make sure that when

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1 the carbon is spent, we can immediately remove it
2 UNIDENTIFIED QUESTIONER: Are you going to
3 re-treat the removed soil as is, or are you going to
4 screen out the rocks and gravel and treat them separately?

5 MR. ANTONIOLI: At the site there's not a lot of
6 big rocks. There's some gravel. From my understanding of
7 biological treatment, a lot of times they do screen out
8 that material and treat it differently like large rocks,
9 steaming clean the rocks, get the contamination off the
10 rocks and treat those separately. That's something that
11 we consider, and that aspect would be dealt with under the
12 design of the system.

13 MR. ANTONIOLI: Any other questions?

14 (No audible response.)

15 MR. ANTONIOLI: Okay, we're going to take about
16 a ten-minute break.

17 (Whereupon a brief recess was taken.)

18 MR. KIRLEY: I'll ask anybody who wants to
19 present comments during the hearing, this is another
20 opportunity to sign up on the comment sheet on the front
21 table there.

22 I'd like to briefly go through the rules for
23 presenting comments, kind of a structure that we want to
24 use here in order to make the hearing go relatively
25 smoothly. I'm Bill Kirley with the State Superfund

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1 Program and I'll just kind of monitor the presentation of
2 comments and give the order of commentors. What we want
3 to do is make sure that everybody who is interested in
4 presenting comments has signed in on our sign-in sheet.
5 Each person giving comments, we will ask you to limit your
6 questions to no more than 15 minutes. If somebody is
7 giving comments and they have more that they have to give,
8 at the end of 15 minutes, we'll ask you to give the others
9 the opportunity to present their comments and you can be
10 given more time after everyone else has spoken. Please
11 give your comments up here from the microphone so that
12 everybody can be sure and hear what you say.

13 We're transcribing the hearing so please speak
14 slowly and clearly. Give your name, and if applicable,
15 the agency or organization you represent. If you have any
16 printed material that you want to have included in the
17 administrative record, please give a copy of your printed
18 material, whether it's a copy of your written comments or
19 some other material that you want to submit, to the court
20 reporter and it will be officially submitted that way and
21 included in the administrative record for the decision of
22 the site.

23 All the comments given here during this period

24 and any written comments you submit will be considered by
25 the agencies in making the final decision on the remedy at

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1 the site. The agency will put together a responsiveness
2 summary, which details how the agency considered the
3 comments and what the agency's reaction was. If it's a
4 kind of comment that calls for a response, if the agency
5 took a different technical view, that will be spelled out
6 in the responsiveness summary and will be presented along
7 with the Record of Decision, the final decision document
8 for the action of the site.

9 During the comment period, someone can come up
10 and present whatever information they want. We ask you to
11 limit the information to the Montana Pole, NPL Site, not
12 Superfund in general, not some other site, please, because
13 we do have a lot of people that want to give comments
14 relating to this site. We will not be able to respond to
15 questions. This is only for presenting your comments and
16 we ask people in the audience not to respond to the
17 comments. This is for them to present their comments into
18 the record.

19 The question-and-answer period is something we
20 already had. This is merely for formal presentation of
21 oral comments. Are there any questions about the rules of
22 procedures? You're ready to go.

23 All right, what I'll do is go through the list
24 the way people signed up and we'll ask first John W. Ray
25 from MEIC.

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1 MR. RAY: The first thing that I want to mention
2 is that I do have written comments that I'd like to submit
3 as part of the official Record of Decision.

4 In looking at the proposed remedy for the
5 Montana Pole Site, it is a Superfund site, and I think
6 that the proposed remedy must be judged in terms of the
7 Superfund Program. The purpose of the Superfund program,
8 CERCLA and SARA, is to clean up hazardous waste sites
9 which are a threat to the human health and the environment
10 of an area. Remedies under Superfund should provide a
11 permanent cleanup remedy, not temporary containment or
12 simply removal to another site.

13 If you look at the term "cleanup," simply
14 cleanup is the act of cleaning up. And the term "clean"
15 means pure, free from dirt, contamination, impurities.
16 According to the EPA publication entitled Superfund:
17 Environmental Progress, the purpose of Superfund is to
18 achieve long-term cleanup goals for sites and to remove
19 contamination from the environment. The document further
20 states that the law directs EPA to protect public health
21 by meeting strict cleanup standards at each site. And
22 reduced to its environmental essence, the publication
23 states: "The new Superfund mission is to make sites safe,
24 to make sites clean, and to bring new technology to bear
25 on the problem."

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1 In accordance with Superfund law, the selected

remedy for the Montana Pole Site must, to the maximum extent possible, make the site free of contamination. The remedy should be a cleanup remedy, as I defined "cleanup" earlier. Any remedy short of this goal is not being faithful to CERCLA, SARA, to Superfund. And if you read SARA, it should be a permanent remedy.

This to me and to my organization is the overriding criteria to judge cleanup alternatives at the Montana Pole Site. The need for cleanup is particularly acute given the serious nature of contamination at the site. And I think that sometimes in considerations of cost, for example, we lose sight of what are called the "two major threshold criteria." The first one is to protect human health and the environment. My reading of CERCLA and SARA is that that is the No. 1 criteria, and that other criteria are subsidiary and secondary to that.

If we look at the hazardous substances that are at the site, and they are identified in the proposed cleanup document, they represent serious potential health threats and environmental threats. They can cause cancer, birth defects, skin diseases, weaken the immune system, produce reproductive disorders, liver damage, kidney damage. Dioxin, which is present at the site, is generally considered to be one of the most toxic

substances known to man.

The Montana Department of Health and Environmental Sciences and the EPA has correctly concluded, and to quote from their document, that

"There are excessive human health cancer risks and excessive noncancerous health hazards associated with hazardous substances at the site. Actual or threatened releases of hazardous substances from this site, if not addressed by cleanup, may present a current or potential threat to public health, welfare and the environment."

Unfortunately -- and I think we have a unique opportunity at this site, but unfortunately in the past, Superfund efforts have not met the goal of cleanup. The Office of Technology Assessment, the OTA, has concluded that Superfund remains largely ineffective and inefficient and is not working environmentally. The OTA has also concluded that the Superfund program has too often settled for remedy technologies which do not eliminate or reduce toxicity, mobility or volume at the hazardous site.

All too often Superfund has settled for remedies short of cleanup. I don't think that at this site we can settle for a remedy short of cleanup. Given the serious nature of the contaminants at the Montana Pole Site, we can not allow any remedy short of cleanup. We must insist that the site be made free of contamination. We must

clean up the problem so that future generations don't have to deal with it. I would not want to see another meeting 20 years from now or 30 years from now where the same thing is being discussed that would contain the contamination level. We need to clean it up.

Another reason for cleanup, as I've defined it, is that this is, as was articulated earlier this evening, a major National Priorities List site. It will be precedent-setting for cleanup not only in the Clark Fork Basin, but nationally. We can either have a good precedent or we can have a bad precedent. A bad precedent would be to leave the contamination as a permanent perpetual health and environmental problem.

As I'll articulate in few moments, this is what would occur under Remedies 1 through 4. We would have a permanent perpetual health and environmental problem that does not square with the requirements of the nine criteria, that does not square with CERCLA, nor does that square with SARA. What if Superfund disappears and we have this contamination on site? Who will deal with it 50 or 100 years from now?

We're putting a great deal of faith in the permanency of Superfund. It makes much more health and environmental sense to clean up the problem now. A good precedent would be to clean up the site, a real,

permanent, complete, cleanup instead of just moving the contaminants or storing the contaminants or leaving the contaminants in place. I argue that we need to clean up the contaminant once and for all. And if we are to meet this goal of actually cleaning up the Pole Plant Site, it's obvious to me that only alternatives 5-B and 5-C meet that criteria. Alternatives 1 through 4 would settle for less than cleanup; and therefore, should automatically be discarded given Superfund law. Only Alternatives 5-B and 5-C really address the nine criteria for evaluating cleanup alternatives, particularly the two threshold criteria for protecting public health and the environment and compliance with applicable or relevant and appropriate requirements.

Given the available information, only Alternative 5-B, which is the preferred alternative, fully meets the nine criteria, particularly the two threshold criteria. Alternative 5-B would address all actual and potential sources of contamination with a view to cleaning up these sources. Alternative 5-B would offer maximum protection for the public health and the environment. It most fully complies with applicable or relevant and appropriate requirements. It provides both short and long-term effectiveness. It actually does clean up the site by reducing toxicity, volume, and mobility of the

hazardous waste present. It is implementable; it is cost effective; it has State Agency acceptance, obviously; and it would be most acceptable to the community.

My reading of community sentiment is that people in Butte want these sites cleaned up. Their criticism has been there has been too much study, there has been too much talk. It's time to clean it up, not leave it in place for future generations to deal with as would occur under Alternatives 1 through 4.

Now, I have deliberately left out Alternative 5-A because it relies upon on-site incineration to clean up the situation. I believe that incineration has several severe negative consequences that call for its rejection as a suitable cleanup alternative. Given the 15-minute time limit, I don't have time to go into all of these. I have submitted as part of my documentation a discussion of that, problems of the health effects of incineration, ash problems, ground and surface water pollution problems, cost problems, and negative economic consequences, as well as eleven specific problems with EPA on-site incineration that I would like addressed.

Cost has been mentioned as one of the nine criteria. And cost certainly is important, but all too often we let cost be the driving factor. And I would make the argument that we have a tendency to sacrifice, and

this has been a problem with Superfund, to sacrifice protecting the health and environment of an area to cost considerations. Cost is not the most important criteria. Protecting health and the environment is.

The whole point of Superfund is that polluters must pay, that those responsible for pollution must pay. Take this as analogy: Have vandals in and destroy a school. They are ordered to clean it up by the judge. Would it be logical or feasible so try to say, "Well, clean it up but pick the cheapest remedy"? We would demand that the site be returned to the best available condition. We should do no less when we are about human health and protecting the environment. We need to give the primacy that is due to health and environmental concerns.

I would also ask the decision makers to apply the test of critical scrutiny to any claims made by the PRPs that they can't clean up the site or that it is impossible to clean up the site. I would ask the decision makers to ask a simple question: Is the primary concern of the PRPs correcting the public health or the environment or is it protecting corporate profit levels?

Doing little or nothing will obviously cost the PRPs less than cleaning up the site. Nevertheless, the mission of the Department of Health and Environmental

Sciences and the EPA as mandated under CERCLA and SARA and RCRA is not to promote or protect corporate profit levels, but to promote and protect the public health and the environment. If you look at all nine selection criteria, cost is only one and obviously secondary to coming up with a cleanup alternative which effectively cleans up the site.

Alternatives 1 through 4 do not clean up the site by definition. Only Alternative 5 cleans up the site. And so we should select one of those, preferably "B" or "C".

Two final points. I think that the contamination under the highway must be addressed. If

cleanup is the goal, a possibly significant source of future contamination such as that under the highway has to be addressed, too. I think that in making the decision about treating contaminants, more attention must be paid to innovative technologies as mandated under Superfund. That is a Superfund goal for pole plant cleanup. For example, the use of solar, the use of ultraviolet light to speed up oxidation of toxic organic waste, particularly in combination with ozone and hydrogen peroxide, photochemical decomposition, and photocatalytic oxidation, de-intoxification processes should also be seriously studied. Also, attention should be given to

eutrophication, assuming no incineration problems are present. The use of advanced electric reactors should be considered, again assuming no incineration problems; super critical water should be considered, vacuum extraction should be considered, and ion exchange should be considered.

In conclusion, though, the primary emphasis returns me once again to cleanup. Which of the alternatives meets the requirements of Superfund to clean up the site? If you look at the information presented, it is only the fifth alternative, particularly "B" and "C", that meets the definition of "cleanup". Therefore, it seems to me that in being true to Superfund, the choice must be one of those two alternatives. Thank you.

MR. KIRLEY: Albert Molignoni from the County Water and Sewer District in Rocker.

MR. MOLIGNONI: Thank you for allowing me this chance to give my public statement. I'm Albert Molignoni from the County Water and Sewer District. Dr. Ray expressed a lot of my concerns with the issue as far as cleanup. I would like to speak on the water issue itself. Coming from an area where we rely quite heavily on groundwater, and most of our groundwater does come from the Summit Valley Basin, which is the Butte area. We are quite concerned of making sure that strict groundwater

cleanup criteria is met.

In ARCO's petition or position paper, they stated due to the ban on drinking water wells in Butte-Silver Bow area, that the site shouldn't have to be cleaned up to drinking water standards. Normally in Butte-Silver Bow County, waters are utilized for irrigation purposes out of wells. My concern is what about some small child drinking that water that is contaminated out of a garden hose that is used normally for irrigation-type purposes?

This water issue is one of the most important issues that's going to be coming down for our generation and future generations. We have to clean up the water. Butte at the present time receives its water supply from the Big Hole River. However, most of you might not know that they are only allowed so many million gallons per day out of that river. If our town is to grow, we have to

18 address alternative water supplies. At the present time,
19 we have one of the largest aquifers in the Summit Valley
20 Basin or in Montana. If we continue to contaminate this
21 aquifer, our future generations will no longer be able to
22 utilize this resource. We feel that any of these
23 Superfund issues, the groundwater should be addressed
24 appropriately. Thank you very much.

25 MR. KIRLEY: Our next commentor is Sandy Stash

1 from ARCO.

2 MS. STASH: My name is Sandy Stash. I'm
3 representing ARCO. ARCO is one of the potentially
4 responsible parties named at this site. Basically, I'm
5 here this evening to express ARCO's disagreement with the
6 remedy as proposed as the preferred remedy by the State of
7 Montana.

8 The reason I state that is ARCO feels very
9 strongly that the State has grossly overestimated the
10 effectiveness of Remedy 5 to get to some of the very goals
11 that Dr. Ray and Albert were speaking of, and grossly
12 underestimates the implementability, in other words, the
13 technical ability to reach those goals.

14 I would invite the people in the audience and
15 the State to take a look at some handouts we have here
16 this evening. We attempted to put ARCO's position on the
17 Pole Plant in a concise, easy-to-read format. We've also
18 gone through the effort of comparing the alternative
19 chosen or currently preferred by the State with the
20 alternative that we think makes a whole lot more sense.

21 I guess before I get into our points of
22 disagreement, I'll talk a little bit about where we are in
23 agreement with the State on the remedy selection. Again,
24 I'll direct you to our little one-page piece on this. In
25 general, we are in agreement that the materials in the

1 pole barns are best dealt with with bioremediation. We
2 also agree in general with the manner in which the State
3 is viewing addressing sludges and oily materials on the
4 site. Where we have our strongest disagreement is in the
5 area whereby the State suggests an attempt to remove large
6 quantities of material. Large quantities of material that
7 I'll point out to everyone in the audience and to the
8 State is below the groundwater table.

9 In order, I think, to more clearly explain
10 ARCO's position than perhaps the State was able to do in
11 Brian's earlier comment, I'm going to contrast this site
12 to a site very near this site where ARCO has agreed to
13 remove materials from below the groundwater tables, and
14 that is the Colorado tailings site. In that site ARCO has
15 agreed to spend in excess of \$40 million removing the
16 materials both above and below the groundwater table.

17 Why are we doing that? We're doing that because
18 we think we can do it, and we're doing it because we think
19 by removing those materials, we're going to help to fix
20 the problem. I'm going to contrast that with the Pole
21 Plant where we don't think, first of all, that it can be

22 done in the fashion that Brian Antonioli has described,
23 and certainly not to the goals that the State has set out
24 for this.

25 If I can describe to everybody the difference

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1 between those two sites, the Colorado tailings contains
2 materials, primarily tailings material that contain heavy
3 metals. I'll contrast that with the Pole Plant Site
4 whereby materials are contained basically of an oily
5 nature. At the Colorado tailings, we believe we can
6 dewater or remove the water from the tailings in order to
7 facilitate movement of those materials. That can't be
8 done at the Pole Plant.

9 If I may describe to everyone what the site is,
10 we have a floating layer of oil on top of the groundwater
11 table underground. If we were to attempt to dewater that
12 site, in other words, pull the groundwater table down in
13 order to get the materials dry, we would take that layer
14 of oil and we would smear it. And what we would do is
15 actually increase the amount of contamination.

16 The other option, because that clearly is not
17 one, would be to attempt to dig those materials out while
18 under groundwater. Some test trenches were dug last
19 summer and they also did some close observation of the
20 work that Ron Bertram with EPA did last summer with
21 removal of the manganese stockpiles. That is not a little
22 bit of water down at that site. Once a trench is dug,
23 you're in water. I won't even call it a swamp; it is
24 water. It fills in quicker than you can get the bucket
25 out of the water. Again, if I might point out to people,

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1 what that would amount to is water with oil mixed with
2 dirt and mud. We don't even believe you can keep the
3 excavation open.

4 What does this mean? It means that we're going
5 to have a real difficult time trying this, but more
6 importantly, it means that we're never going to be able to
7 get the percentages of oil and contaminated material that
8 is contended or that is suggested by the State of Montana.
9 You can't get 90 percent. We feel you would be extremely
10 lucky to get 50 percent.

11 If I can talk a little bit also, I think, about
12 the scenario here that has not been described as far as
13 what this is going to be like for 11 years at that site.
14 First of all, not only do we think we're not going to do
15 near so well as the State is suggesting, we believe that
16 this action could actually make things worse. If you can
17 envision something as simple as oil and water, for
18 instance in salad oil, once you mix that and you will be
19 mixing it with a bucket, you are going to create an
20 emulsification.

21 Most importantly, you will be taking product,
22 oil, that currently floats on the groundwater and you will
23 be enabling that material to dissolve into the
24 groundwater, the very thing that this remedy is trying to
25 fix. If I can remind everyone, the whole intent of the

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removal here is not protecting people from materials on the surface. Indeed, that's already pretty safe as outlined in the documents.

The attempt here is to fix the aquifer. We believe in this instance by removing the source, attempting to remove the source, you're actually going to spread the source, you're going to make more of that oily source dissolve in groundwater, and you're going to have potentially more contaminated groundwater than we have right now.

I think the second thing that people need to realize, and I was somewhat interested in the discussion from the gentleman in the back of the room that talked about working at this plant, for those of you who live by that site, I think you're aware now that that site is fairly stable. It certainly isn't what it could be, but certainly it doesn't present the kind of hazards that the gentleman that worked in the plant presented.

Should this material be mucked out - and I will use that word because I don't know how else to describe wet, soppy, oily, muddy material being dug out with heavy equipment - that material will be stacked on site. I cannot understate the unpleasant and unstable situation that will be created at the site for an estimated 11 years.

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I guess in closing this section of my comments, all of this for a goal that technologically cannot be achieved. Several of the earlier speakers stressed this issue of choosing a remedy that will clean this site. None of the remedies presented will clean this site from the viewpoint of fixing that aquifer in any time in the foreseeable future to an aquifer that will be usable for drinking water. That is extremely unfortunate and I share Dr. Ray's sentiment that the best way we could spend money is to work quickly toward better ways to deal with these problems. They do not exist. I am simply stating that No. 5 is going to get you no further than Alternative 3 or 4, or potentially 2, as it relates to fixing that groundwater.

ARCO's solution or ARCO's suggestion on this basically is support for Alternative No. 3 or some slight modification of Alternative No. 3. That remedy is a better remedy. It's a remedy that would require about three years. It's a remedy, as Brian suggested, that would require pumping well into the future, in other words, a continued collection and treatment of groundwater. Once again, I can guarantee you that Alternative No. 5 will also require groundwater treatment well into the foreseeable future.

The remedy that we're suggesting includes

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containment, isolation, and treatment of groundwater. What does this mean? This means that we believe this alternative can prevent any more seeps or any more oil

from entering Silver Bow Creek. We believe it can be isolated from the creek. We also believe that the size of the impacted groundwater or the current plume can be controlled so that no more groundwater is contaminated than what has already been contaminated.

We believe that the oily waste can be treated and we believe that biotreatment of accessible soils - and I'd define "accessible soils" as those soils already in the pole barns and those soils sometimes defined as "hot spots" that can be easily removed - they can be removed to provide a surface at that site that is very, very safe for people to utilize. What won't be safe for people to utilize is the groundwater, and that is the case in any of the alternatives being discussed.

What you would get with this is you're going to get a cleanup that can be done in the next couple of years, a cleanup that can create an asset for the community, and it's a cleanup that can be done in conjunction with the Colorado tails removal that will vastly improve both the aesthetics as well as the environmental and health quality of that area down on the west side of Butte. The site will be stable, the site

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will be safe, and, yes, the remedy will be more cost effective. Most importantly, it will be money spent fixing a problem rather than money spent fixing a problem that technology does not exist to correct.

That was going to be the close of my statements. I am, however, going to correct very quickly a couple comments that were made earlier, I think, that provide some inaccuracies. Brian referred to a \$5 per cubic yard estimate on removing soils under water. Many of you that work in the construction field will probably find that quite funny. We learned a lot between the time that that number was first generated. One thing we learned was we hired a new contractor. Secondly, we learned a lot from Ron Bertram and we learned a lot from exploring sites throughout the country. We'll be very, very lucky, any of us, to be involved in this cleanup if you can remove that soil below groundwater for \$17 a yard.

I also would invite everyone to view our position paper. For those of you who aren't aware how Superfund works, although ARCO was under an agreement or order from the State of Montana to do the FS, much of that Feasibility Study document that we wrote was changed considerably by the State of Montana. We have a great deal of concern that the Feasibility Study misses some of the very salient points that I'm trying to make here

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tonight as to the effectiveness and implementability of this remedy. I can provide a copy of that position paper to anyone who wishes, and I would be happy to answer questions after the session if anyone has any. Thank you.

MR. KIRLEY: Our next commentators are Mike Fitzgerald and Jon Sesso of Butte-Silver Bow County Local Government. It looks like Mike Fitzgerald is going to do

it, start the comments on his own.

MR. FITZGERALD: My name is Mike Fitzgerald. I'm the Upper Clark Fork Superfund Technical Specialist, and tonight I will be providing technical comment on behalf of the local government of Butte-Silver Bow. After carefully reviewing the site's Feasibility Study, regulatory and industry's positions, and various other technical input, the County has formulated what we believe to be a practicable viewpoint regarding the Montana Pole Plant's proposed remedial alternative. This testimony is intended to point out the areas of mutual agreement and provide input on behalf of the local government.

The first of three points is in regards to removal alternatives. The County feels that there are five points in which there is a mutual agreement between EPA, the State, County, and similar views by ARCO.

Alternative No. 1, Alternative 1 and 2 do not provide the long-term effectiveness and permanence to

adequately protect human health and the environment.

Number 2, Alternatives 3, 4, and 5 could be utilized as long-term remedies if correctly implemented.

Number 3, the on-site oils, the sludges near stream soils, previously bagged soils and surface hot spots need to be addressed.

Number 4, as there is an increase in the amount of contaminated soil excavated, there is a decrease in the ease of implementation and a decrease in the amount of source to control.

And lastly, under Alternatives 3, 4, and 5, the need for an extensive and possibly permanent groundwater containment system, containment, reduction, and monitoring program will be needed.

The second point is concerning the soil remediation technology. The local government has the belief that a multiple soil remediation technology approach may be necessary to effectively reduce the contamination in the soil to an appropriate level. However, Option "A" where on-site incineration is considered, is not seen as a feasible option in Butte because of our local climatological patterns, i.e., temperature inversions; thus, we look forward to the results of the bioremediation and soils washing demonstrations for this summer.

And the last point is concerning two items of reservations that we have with the alternative selection process. First, what are the logistics and effectiveness of product removal in and around the groundwater table with respect with specific emphasis being placed on the amounts of product that maybe driven into the dissolved phase and perhaps creating a larger problem by choosing a maximum removal option?

And secondly, although the hydrologic interaction between the Montana Pole Site and other ongoing activities will be addressed in more detail during

the design and work plan stages, the stability of the Montana Pole Site's groundwater must be considered now by correlating the anticipated complexities of the other ongoing activities to, No. 1, the amount of source control needed for each remediation alternative, and No. 2, the percent of contamination remaining post remediation.

In conclusion, the county looks forward to continuing a dialogue regarding the technical merits of each of the removal alternatives and soil remediation technologies as they pertain to a practical and a technically sound final remedy. Thank you.

MR. KIRLEY: Jon Sesso of Butte-Silver Bow County has additional comments.

MR. SESSO: My name is Jon Sesso. I'm the

planning director for the consolidated government of Butte-Silver Bow County. I also serve as the Superfund coordinator for the county and I'm speaking on behalf of the local government. I'll just say right away more in conclusion of what Mike said that for those of you expecting the County to take a firm position on any of the alternatives tonight, I'm sorry, to disappoint everyone. We believe that making a choice this evening is tantamount to taking sides in this particular issue and we feel confrontation is not the answer in this complicated case.

It appears to us that there is a great deal of consensus on many of the aspects of this cleanup remedy. We've heard tonight that everybody agrees that the surface contamination areas, these so-called "hot spots", need to be remediated. Everybody agrees that the soils stored in the metal buildings since 1986 need to be remediated and should be. There seems to be a broadening consensus that bioremediation is the best alternative to clean these soils.

There seems to be some serious agreement that some level of pumping and treating to limit or eliminate the contamination of groundwater will be needed for many, many years until we are all reasonably assured we have extracted most of the pollution and its threat to the groundwater. We seem to be coming to a consensus this

evening that Alternatives 1 and 2 are out, that they do not provide the long-term protection everybody apparently wants to achieve, and that Alternatives 3, 4, and 5 could be used as a long-term strategy in a remedy, as Mike said, given proper, correct, and effective implementation.

We just hope this evening that all parties can concentrate a little more on the existing agreement and not allow any singular conflict to blind us from making good decisions. And towards that end, and this is meant for particularly several of my attorney friends in the audience, the County believes that we should get started immediately on those items that we already have consensus and agreement on, and perhaps defer the final decisions on the contentious issues until better information is available, particularly the fact that we're running a

16 pump-and-treat operation down there right now and we are
17 getting oil out of the groundwater. And the longer it
18 runs, the more confident we are that, you know, something
19 is being done to protect human health and the environment.

20 As for tonight, instead of picking among
21 alternatives, we believe that it's more important to state
22 clearly what the local government's priorities are in this
23 cleanup action, what we believe should be considered in
24 choosing among the alternatives. We have six points to
25 mention.

1 First of all, we support the solution that
2 results in timely implementation. As has been mentioned,
3 the time for studying is done. In essence, we support the
4 solution that allows us to reach agreement as quickly as
5 possible and get the work started.

6 Second, I think it's pretty clear by now we
7 support the solution that uses bioremediation
8 technologies. We'd like the Bs of Alternatives 3, 4, and
9 5.

10 Third, we support the solution that is most
11 practical, both in terms of technical effectiveness as
12 well as cost. "D", we support the solution that relies on
13 the best scientific advice and information and removes the
14 maximum amount of pollution from the area. At the same
15 time, speaking on behalf of the local government and its
16 taxpayers, we support the solution that stands up to the
17 rigors of a fair, thorough cost benefit analysis.

18 Fourth, we support the solution that assures the
19 Montana Pole Site can be remediated in synch with the
20 cleanup of the full lower Area 1. There should not be any
21 delay in the current schedule at LAO and any entanglements
22 with the Montana Pole Site must be adequately addressed
23 now in this decision-making process. For once, and
24 perhaps we might even start a trend, we would hope we
25 could plan properly and fully consider the linkages

1 between the various sites within our one community of
2 Butte.

3 Fifth, we support the solution that supports an
4 acceptable land use in the long-term, for example, as part
5 of a green belt corridor for which planning is underway
6 for the areas to the east, to the north, and to the west
7 of this site. While the County holds no unrealistic
8 expectation that the site will be remediated to its
9 pristine status of pre-1860, neither will the remedy be
10 tolerable to us if the area and land cannot be used by
11 present and future residents for some worthy purpose.

12 In this regard there has been much talk about a
13 cleanup to support residential uses versus a cleanup that
14 would support industrial uses. The County would like to
15 recognize fully the rights of the current property owners
16 at this site and urge that we compromise as to what we
17 demand in terms of land use. At the same time, we would
18 offer that if there are any advantages to changing
19 existing zoning ordinances and land-use policies that

20 would allow for an orderly, timely, effective cleanup,
21 Butte-Silver Bow is willing to consider such changes.

22 And our last and most important priority is the
23 local government of Butte-Silver Bow supports the solution
24 that has the support of its citizens. And I have heard
25 greatly from its citizens in the last several weeks

1 leading up to this hearing, and I suspect throughout this
2 comment period, there is a great debate. One should say
3 there has been a healthy dose of point-counterpoint going
4 on, but there is also, at least from what I hear, a
5 willingness to compromise, a willingness to listen in
6 favor of getting the job started and getting it done
7 within the lifetime of current and future public employees
8 and its citizens.

9 As county officials, we are listening tonight
10 and we will continue to listen. We hope that whatever
11 record is produced in this responsiveness summary is as
12 complete as possible, and that we fully expect the Health
13 Department from the State of Montana and its federal
14 counterpart, the EPA, to continue to include the County
15 and its residents along with the PRPs in the
16 decision-making process. Thank you.

17 MR. KIRLEY: Our next commentor is Mary Kay
18 Craig of the Clark Fork - Pend Oreille Coalition.

19 MS. CRAIG: My name is Mary Kay Craig. I was
20 born and raised in Butte and I reside here. I work for a
21 bunch of fishermen, fisherwomen, and fisherchildren. I'm
22 the upper river field representative for the Clark Fork -
23 Pend Oreille Coalition, a nonprofit grassroots
24 organization made up of about 1500 members, volunteers
25 from Butte and Anaconda, downstream through Deer Lodge and

1 Missoula, to Lake Pend Oreille in Sandpoint, Idaho.

2 The coalition's mission is protection of the
3 entire Clark Fork watershed, and work from the headwater's
4 Butte office is 99 percent oversight of Superfund cleanup
5 activities. The Montana Department of Health and
6 Environmental Sciences and U.S. Environmental Protection
7 Agency in their May 1993 document entitled the Proposed
8 Plan presented their preferred remedy, 5-B.

9 The coalition supports that plan and asks the
10 agencies to take the following factors into account.

11 One, the remedy must do everything possible to
12 meet MCLs, maximum contaminant levels, for PCPs on site.
13 ARCO prefers not to have to meet the required water
14 quality standards and likes to call into question whether
15 or not it is technically feasible to do so. The coalition
16 encourages the agencies to incorporate a sufficient number
17 and type of barriers and containment systems into the
18 design and work plan, even to go beyond what might
19 currently be envisioned. Water quality standards are
20 applicable, appropriate, and relevant and they must be met
21 as threshold criteria for remedies in the Superfund law.

22 Two, the coalition reminds the agencies that
23 permanence of remediation is required by Superfund law.

24 In fact on October 17, 1986, CERCLA was amended by passage
25 of the Superfund amendments and the authorization act of

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1 1986, SARA. Among other things, this expressed Congress'
2 bias in favor of "permanent" treatment. A cursory glance
3 at SARA's new provision, Section 121, "cleanup standards"
4 reveals the word "permanent" or "permanently" appears four
5 times on the same page within the first three paragraphs.
6 And that's in statutes, U.S. Statutes 100, page 1672.

7 It's a word assiduously avoided by the Butte
8 area Superfund site's major responsible party. ARCO
9 refers instead to "long-term effectiveness," which appears
10 only once in the same three paragraphs.

11 Alternative 3-B, capping the site after
12 treatment of a small amount of the carcinogenic
13 contaminants, leaving contamination in place, what ARCO
14 prefers to do, is not a permanent remedy.

15 Three, our third point is that decisions made
16 for cleanup standards at the Montana Pole Site are
17 precedent setting. This is the first site in Butte for
18 which a permanent remedy will be chosen. If ARCO is
19 allowed to escape the required water quality standards
20 here, it will be much easier for them to argue for lower
21 quality cleanup standards throughout the entire Clark Fork
22 Basin from Milltown to the Berkeley Pit, including Butte
23 stormwater runoff and over 100 miles of toxic streamside
24 tailings.

25 Agreement issues, as discussed here by ARCO, in

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1 Butte-Silver Bow are obvious. Deferment of contentious
2 issues only plays to the delays that are of the advantage
3 only to ARCO. The coalition commends the agencies for the
4 high quality of the technology and the information
5 provided to the public.

6 And in conclusion, the Clark Fork Coalition
7 suggests the State and EPA give as much consideration to
8 the word "permanence" as they do to the word "cost". Mr.
9 Pizzini just said that they must be prepared to justify
10 costs. We hope the agencies will also put themselves in a
11 position to justify anything less than a very definite
12 permanent remedy. Thank you.

13 MR. KIRLEY: Our next commentator is Mel Rowling
14 from CTEC.

15 MR. ROWLING: I'm Mel Rowling with the Citizens
16 Environmental Technical Committee. I'm the current
17 president. Issues of Concern and comments to CTEC, the
18 members of CTEC, residents in the affected neighborhoods
19 in the Butte community have participated extensively in
20 the planning and information gathering and disseminating
21 process associated with the work at the Montana Pole
22 Treating Plant.

23 Before expressing several concerns that remain,
24 we wish to acknowledge the helpfulness and cooperation
25 that we have received from EPA, the Montana Department of

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1 Health and Environmental Sciences, and ARCO

2 representatives. They have helped answer a lot of the
3 technical questions that we have brought up and have
4 clarified many of the technical issues raised during the
5 search for the appropriate remediation.

6 One concern that we have is recognizing the fact
7 that the intercepting wall was installed to contain only
8 floating products. A number of the CTEC members have
9 expressed concerns that PCP dissolved in the groundwater
10 will continue to move past the intercepting wall and
11 affect water quality of Silver Bow Creek. These people
12 wonder whether the amount of PCP loading to the stream has
13 increased since the wall was installed. They feel that
14 the agency needs to quantify continued contaminant loading
15 of the stream over the projected life of the project under
16 each alternative to compare how well groundwater/surface
17 water quality goals can be met under the different
18 alternatives.

19 Number 2, there is some concern that the
20 decision at the Montana Pole Treating Plant may set a
21 precedence for further decisions to be made at other sites
22 in the area, particularly located downstream. CTEC has
23 heard from many people in the area that the remedy chosen
24 at the Montana Pole Treating Plant must be consistent with
25 the goals and objectives set both for this site and

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1 consistent with the goals and objections set forth and the
2 impacts downstream, while other decisions must be
3 compatible of meeting discharge water quality goals to the
4 Silver Bow Creek. A number of respondents stressed that
5 the final decision should reflect currently known land-use
6 goals at the site and not a standard of cleanup that far
7 exceeds what is needed for the anticipated use of the
8 site.

9 Number 3, given the technical disagreement
10 between ARCO, the Montana Department of Health and
11 Environmental Sciences about the agency's preferred
12 remedy, one of the most common voiced concerns about the
13 permanency of any of the remedies, even the most
14 aggressive remedy chosen, 5-B, would leave contamination
15 bound in the soil below the smear zone. If a more
16 aggressive and expensive treating plan is chosen, it seems
17 reasonable to expect relatively complete cleanup and a
18 prospect for bringing the site back into productive use
19 for the community. It is hoped that negotiations toward
20 the Record of Decision will resolve the technical
21 differences currently dividing ARCO and the Montana
22 Department of Health and Environmental Science, primarily
23 regarding the implementation and the cost-preferred
24 alternatives. Otherwise, the public's level of confidence
25 in the performance of the remedy and the viability of the

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1 process will be undermined. Thank you.

2 MR. KIRLEY: Our next commentator is Theresa Marie
3 Craig.

4 MS. CRAIG: My name is Theresa Craig. I'm a
5 Butte resident and I live nearby. I have recently been in

contact with a person who is very sick. His environment has been filled with cigarettes and alcohol for years. And so I have been dwelling on how silly it is for death and sickness to be caused by our environment and how needless the suffering is. My Aunt Katie used to play in the Montana Pole Site when she was a youngster, both her and my best friend's mother have had cancer. No one can say for sure that this was or was not caused by the PCPs from the Pole Plant Site, but like alcoholism and cigarette addiction, sickness that could be caused by the pole plant could be prevented and it should be. I and my family want the best possible cleanup. Thank you.

MR. KIRLEY: Our next commentor is Jim Riley, a former Pole Plant worker.

MR. RILEY: Good evening. My name is Jim Riley. I am a former employee at the Montana Pole Plant. I was logging, cutting, and hauling fence posts and power posts to the Pole Plant. And I would be there at four or four-thirty in the afternoon and would come out about three days a week where I worked as a laborer on the

cooker. The pressure cooker was to pressure cook railroad ties, pilings for driving in for the construction of buildings, posts for guardrails on the highway, corral poles, whatever had to be treated in the cooker. It was pressure and heat. It would have to be approximately two hours to relieve the pressure. They had like a pressure cooker on the stove. We'd remove the doors, and they had trucks that was five feet long. The cooker was approximately 60 feet. We pulled those little trucks and pushed them in with a vehicle, and the chains was just a hook. And sometimes the chain would come off and I'd have to crawl in with a cable at that time. If I was asked to do the same thing now, I probably wouldn't do it, but at that time we didn't know we had rights, we just done it. I was paid double time to do this.

The laborer would take that, they are railroad tracks that was pipes around, it was approximately five -- I had to duck down, it was approximately five feet high and maybe seven feet wide. And you would crawl in. I went through the end of it to hook the cable up. The fluids would drain out, it was a railroad track, you would crawl in. You had old clothes on. And it wasn't too bad for the third car in, but if you went all the way to the end, by the time I got out, you would go outside and throw up for 15 minutes.

I heard a gentleman comment in the question-and-answer that PCPs could possibly cause cancer. And I would like to ask Montana Department of Environmental Sciences and the Superfund and whoever, if you're worried about the health now of the people, to consider all the former workers and myself, to consider our health. It scares me now. At that time I didn't think too much about it, but now it's '54 to '94 would be 40 years, but you still are apprehensive.

On the proposed plan for the Montana Superfund Site they have on page 3, it said that the first column of better than halfway down:

"Montana Pole operated as a wood-treating facility from 1946 to 1984. During most of this period, a solution of about five percent pentachlorophenol mixed with petroleum was used to preserve poles and posts."

I worked there. It was the summer of 1954 when this thing, this creosote until that time, 1954 to, everybody was happy because they were getting these products. Before, if you get a creosote sliver, your hand would swell up double. And with this they said it was the cows could rub up against it and they could use it for a salt lick. And the major selling point at that time was that it wasn't -- the biggest thing was they were selling treated posts to farmers. It wouldn't hurt the animals.

If the pole was going to be buried such as power poles, they put six foot, we used to stand them up and they had vats, maybe 20 on a big vat, and they would treat the power poles with creosote. This was in 1954, '55, '56, '57 and '58 when I was working there part-time. The poles that was to be buried was creosote treated and everything else was just pentachlorophenol.

I'd like to close by saying I urge you to find the best way to clean this up. I would also urge the Montana Health Environmental Sciences to consider the former employees. I believe they should be primary concern. If it's contamination now, those of us who worked there should be considered. I thank you.

MR. KIRLEY: That is the group of commentors that we had signed up to present comments tonight. Is there anybody else who has not had the opportunity to present a comment that would have something to add?

John Ray, some additional comments.

MR. RAY: My name is John W. Ray and I spoke at the beginning. I think I forgot to identify myself as the president of the Montana Environmental Information Center. I'm also a citizen of Butte. I just want to make a few comments. It's interesting when you hear the testimony, particularly the testimony from citizens, which is probably in many respects the most valuable because they

don't have a financial ax to grind in this situation.

You hear a lot of different words, words like "cleanup, permanence, implementation possibility, precedent-setting decisions, cost, protecting the health and the environment." And a lot of times when all these words get thrown out and thrown together, I think we lose site of a few simple truths or a few simple facts in assessing something like the Pole Plant or any other Superfund or toxic waste site.

To me the first and overriding fact, whether you go back to Love Canal or whatever you look at, is that the materials that are present at that site, at the Montana Pole Site, represent severe threats to the public health

14 and to the environment. I think what often occurs is that
15 when corporations and when government officials start
16 talking, we lose sight of that. For example, in the
17 6-point or 7-point presentation by Butte-Silver Bow, I
18 didn't see expressed anywhere in that an overriding
19 concern for the health of the citizens of Butte-Silver
20 Bow. I heard questions about land use and other such
21 things, but I think the overriding concern should be the
22 permanent protection of the health of the citizens of
23 Butte-Silver Bow.

24 That can only be achieved by cleanup. As long
25 as those materials that are present at the Pole Plant

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1 remain on site, there's a potential threat of future
2 contamination. There's the strong likelihood that future
3 generations, not just future local government officials,
4 but future generations of citizens will have to deal with
5 the environmental and health consequences of that site.
6 That's why Superfund was created, to clean up and remove
7 those threats.

8 A lot of the arguments that we've heard tonight
9 about implementation, about permanence, the lack of
10 permanence, about remediation versus cleanup were the same
11 arguments made my Hooker Chemical at Love Canal, that they
12 couldn't clean it up and that it wouldn't work and it was
13 too costly. The citizens there proved you could clean up
14 or at least deal with the situation. We should accept the
15 same standards here to accept nothing less than cleanup
16 and a permanent cleanup.

17 That's what the law required, that's what
18 protecting the public health and the environment requires.
19 We don't want to have to deal with the same problem 10,
20 20, and 30 years from now. The Office of Technology
21 Assessment made this statement, that "toxic waste
22 reduction and the removal of toxic waste proceeds slowly,
23 not because of a lack of technology, but because it is
24 inhibited by human organizational and institutional
25 obstacles in industry and government."

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1 We need to overcome these obstacles and clean up
2 the site. We heard the word "precedence" used here. What
3 kind of precedent, both legal and environmental, will be
4 set if we just say at the start, "We can't do it. We
5 can't clean up the site. We won't even try." That will
6 set a precedent. Why try it any other site?

7 I can assure you that the technical experts can
8 be provided by industry to prove you can clean up any
9 site. That has been documented time and again. There's
10 so much confusion, to put it lightly, in the scientific/
11 technical community that you can find experts to support
12 any position you want.

13 The question remains: Do we just abandon the
14 situation at the very beginning and throw up our hands and
15 say, "We can't do it, let's cap it and let's walk away
16 from the it"? That is essentially what would be done with
17 Alternatives 1 through 4. It is essentially doing nothing

18 or doing very little, which given the contaminants at that
19 site amount to the same thing. So do we want to set a
20 precedent where we don't even try?

21 There's strong technical information on both
22 sides. I think a good case can be made that you can
23 remediate and clean up the site. We don't have time to go
24 into the technical data on there. Certainly, the State
25 has what they feel is sufficient technical data. But to

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1 me the danger is to accept a precedent that we won't even
2 try to clean up this site, that we won't do anything to
3 remove the severe health problems that exist at that site.
4 And I think time and again we lose sight of the danger of
5 the contamination levels at that site. This is not
6 something that is, well, fuzzy-wuzzy, it may be nice to
7 deal with. These are serious hazardous substances that
8 can cause, as I mentioned earlier, a host of health
9 problems that must be dealt with.

10 So I would urge the State to keep in mind what
11 CERCLA, what Superfund mandates, that a permanent, cleanup
12 is their requirement that we must at least try to meet at
13 this site, and that we need to set a precedent where we
14 are supporting cleanup, not set a precedent where we say
15 we can't do anything so we won't even try. And again I
16 would like to reiterate, ask yourself the question: Who
17 has the financial interest in supporting one cleanup or
18 one remediation alternative over another?

19 Do you trust a corporation to protect the public
20 health given the record of the chemical industry, the oil
21 industry in this country in protecting the public health?

22 Are you confident that they are really
23 interested in your health or are they really interested in
24 getting off as quickly and as cheaply as possible? That
25 to me is an overriding question that always has to be

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1 asked in evaluating PRP representations as to what they
2 can and cannot do. That to me may not be a scientific
3 question, but it's a political question that must be
4 answered. Thank you.

5 MR. KIRLEY: Is there anyone who has not had the
6 opportunity to present comments that would like to present
7 comments?

8 (No response.)

9 MR. KIRLEY: If not, our public hearing is
10 closed. The public meeting portion of the meeting, I
11 guess, is adjourned. There may be a few people around
12 from the agencies or others who might be around for a few
13 minutes after the meeting to answer any additional
14 questions any of you have.

15 MR. ANTONIOLI: One thing I would add before you
16 leave, if you have comments that you would like to submit
17 in writing, our address is on the Proposed Plan and on the
18 agenda. Please send us those comments. The comment
19 period ends July 7th. Comments will not be received, will
20 not be accepted after July 7th, so you must submit those
21 comments to us by July 7th. Thank you very much for

22 coming. We had a good turnout.
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CERTIFICATE

1
3 STATE OF MONTANA)
: ss.
4 County of Silver Bow)
5 I, Candi Nordhagen, Registered Professional Reporter-
6 Notary Public in and for the County of Silver Bow, State
7 of Montana, do hereby certify:
9 That the public hearing was taken before me at the
10 time and place herein named; that the public hearing was
11 reported by me in machine shorthand and later transcribed
12 by computer, and that the foregoing eighty-seven (87)
13 pages contain a true record of the proceedings, all done
14 to the best of my skill and ability.
15 IN WITNESS WHEREOF, I have hereunto set my hand and
16 affixed my notarial seal this ____ day of _____,
17 1993.
19
22 Notary Public for the State of
Montana residing at Butte,
23 Montana. My commission
(NOTARIAL SEAL) expires September 15, 1995.

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STATE OF MONTANA
DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

MONTANA POLE SUPERFUND SITE

Public Hearing

Tuesday, May 25, 1993

E X H I B I T S

NORDHAGEN COURT REPORTING

CANDI NORDHAGEN

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Butte, Montana 59701
(406) 494-2083

Registered Professional Reporter

*Conference Room
1100 Utah*

ORAL COMMENTORS

PLEASE SIGN THIS SHEET IF YOU PLAN TO GIVE ORAL
COMMENTS THIS EVENING

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9.		
10.		
11.		
12.		
13.		



ARCO's Position on the Montana Pole Plant Cleanup Proposal

History of Operations

The Montana Pole Plant was operated by a family-owned business between 1946 and 1984, and primarily treated telephone poles with a mixture of pentachlorophenol (PCP) and diesel-like fuel, commonly known as penta-oil. In 1983, it was discovered that penta-oil from the plant was seeping into Silver Bow Creek.

Since then, the U.S. Environmental Protection Agency (EPA) has removed some of the highly contaminated soil and stored it in pole barns located on the site. Also, EPA has constructed a water treatment plant designed to remove floating penta-oil from the water table surface.

At this point in the Superfund process, final cleanup plans are being considered. The Montana Department of Health and Environmental Sciences (MDHES) and EPA have offered a proposed, preferred remedy and have invited the public to comment on it. The purpose of this summary is to let you know ARCO's thoughts on the MDHES/EPA proposed cleanup alternative (#5 in the feasibility study) and explain our favored alternative (#3).

The Goal of the Cleanup

As with all Superfund sites, the primary goal of remedial action is to protect human health and the environment. Depending on the location of an individual site, different levels of cleanup response are established to achieve that goal.

At this site, MDHES and EPA have concluded that the appropriate response is to make the groundwater suitable to use as drinking water for residents who may someday live on the site although future residential use is unlikely at this site.

ARCO does not believe the technology exists to clean the groundwater to drinking water standards, given the oily nature of the contamination. We feel the remedy chosen by MDHES and EPA overestimates the ability of existing cleanup techniques to eliminate the

source of the problem.

On the other hand, through proven methods of treatment and containment, we believe the groundwater quality can be improved, the public protected, and the area developed into a safe and attractive greenbelt that will be an asset to the community.

The Proposed Cleanup Plan

The plan proposed by MDHES and EPA calls for several different cleanup actions to take place, most of which ARCO endorses.

1. Prevent contaminated groundwater from flowing into Silver Bow Creek by recovering the floating oil through low rate pumping, and containing and treating the site's groundwater into the foreseeable future.
2. Remove and treat oily wastes, sludge, equipment and debris.
3. Biotreat 10,000 cubic yards of contaminated soil - which EPA removed and stored in the pole barns located on the site - with an organism that breaks down PCP and diesel fuel.
4. Excavate other contaminated soil in isolated areas and biotreat it along with the soils presently stored in the pole barns.
5. Institute controls in the vicinity of the pole plant site on the use of groundwater that prohibit its use for drinking water.
6. Excavate and biotreat 208,000 cubic yards of contaminated soil as deep as four feet below the groundwater level.

MDHES and EPA believe that if all these actions were done, the aquifer beneath the site could be used for drinking water in under 30 years.

Problems with the MDHES/EPA Proposed Plan

ARCO agrees with the first five items in the MDHES/EPA plan, but strongly disagrees with item 6 – excavating soil below the water table throughout the site. ARCO not only feels it will be impossible to bring the groundwater to drinking water standards, but fears that excavation may make the situation worse. Specifically,

1. Some sources of contamination will not be possible to remove.

The excavation proposed in item 6 of the MDHES/EPA plan will occur under water. There is simply no technology available that can effectively remove oily contaminants under these conditions.

2. The contamination may spread if cleanup by excavation is attempted.

Digging below the groundwater level – as proposed by MDHES and EPA – will seriously disrupt the oil floating on the surface of the water. This is comparable to an oil spill on the open seas. While it's easy to skim oil off calm water, it's nearly impossible to skim oil off choppy water. If the penta-oil remains stable, we believe pumping can be an efficient and effective method of cleaning the area. If not, the volume of contaminated groundwater and soil will probably increase.

In similar EPA projects, digging up soil to capture floating oil hasn't been effective. Usually, the area becomes a swamp below groundwater level and the oil quickly spreads through the soil and groundwater. That's why we believe there is a strong probability that excavating here will cause penta-oil to spread deeper into the aquifer and worsen the problem. And when this happens, the only feasible solution will be the same remedy ARCO is proposing now – removing the floating penta-oil by pumping, capping the site, and containing the groundwater with reasonable groundwater treatment.

ARCO's Proposed Alternative

ARCO envisions a solution that fulfills two goals – 1) protecting human health and the environment by controlling the problem, and 2) enhancing the appearance of the community.

ARCO proposes that the site remedy consist

of the first five items proposed by MDHES/EPA, followed by placing clean fill on any remaining contaminated soil. The entire area could be planted with grass, trees and shrubs. The capped soil will act as a barrier that prevents people and animals from coming in contact with any remaining contaminants, and reduces the possibility of rain or snow driving contaminants further into the groundwater. The surface of this site will be clean, and the contaminants will remain stable below the cap.

Instead of viewing the site as a future residential development, this more practical response encourages the development of a usable park. Creating an attractive park to connect the Pole Plant site with the future Colorado Tailings greenbelt area is entirely feasible under the ARCO preferred plan and would be safe for park users and nearby residents. This proposed remedy, which is based on proven methods, would provide the community with an attractive recreational area, with walking trails and possibly picnic areas.

Why the Plans are Equal, Yet Unequal

In either cleanup scenario, ARCO believes the groundwater below the Montana Pole Plant site will not be usable as drinking water.

If the results will be the same, an important question arises. The MDHES/EPA plan is expected to cost between \$27.5 million and \$55.2 million, while ARCO's plan is expected to cost between \$21 million and \$36.6 million.

Does it make sense to spend millions of dollars more on a solution that gets us to the same end point with no additional benefit?

In the end, we believe the MDHES/EPA proposed plan is neither efficient, cost-effective nor technically feasible, and not the best use of valuable and limited resources.

Your Opinion is Needed

ARCO believes that when the community is involved in the dialogue about Superfund projects, the most effective solutions are reached. We are committed to working with the community, other interested parties, MDHES and EPA to find the best technical solution and most cost-effective response to this problem. We hope that you will consider all the facts and voice your opinion.

COMPARISON BETWEEN ALTERNATIVE 3 AND ALTERNATIVE 5
MONTANA POLE AND TREATING PLANT NPL SITE

ALTERNATIVE 3

(ARCO Preferred Alternative)

ALTERNATIVE 5

(MDIHES/EPA Preferred Alternative)

Overall Protection of Human Health and the Environment

- Alternative 3 is as protective of human health and the environment as Alternative 5.
- A cap and institutional controls would be used to limit exposure to contaminated soils and groundwater.
- An effective, long-term enforcement plan for groundwater use and land use restrictions is being developed that would prevent future human exposure to contaminated soils and groundwater. Current land owners are willing to restrict future development on their properties.
- MDIHES believes that under Alternative 5 groundwater would meet Maximum Contaminant Levels (MCLs) for human consumption within 30 years. ARCO strongly disagrees. It is likely that the light non-aqueous phase liquids (LNAPL) and dissolved contamination will be present at MPTP indefinitely in both alternatives.
- Alternative 5 would require the same type of long-term groundwater use and land use restrictions as Alternative 3.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

- Alternative 3 meets all ARARs except for the chemical specific ARAR for groundwater (i.e. MCLs). PCP concentrations in groundwater would likely be greater than MCLs, indefinitely.
- Same as Alternative 3.

FOR
the
record.

COMPARISON BETWEEN ALTERNATIVE 3 AND ALTERNATIVE 5 MONTANA POLE AND TREATING PLANT NPL SITE

ALTERNATIVE 3 (ARCO Preferred Alternative)

ALTERNATIVE 5 (MDIHES/EPA Preferred Alternative)

Long-Term Effectiveness and Permanence

- Capping the former process area and the drainage ditch is an effective means to prevent exposure to contaminated surface and subsurface soils. Continued, long-term maintenance of the cap is easily implementable.
- The groundwater treatment systems would be designed to effectively contain the contaminated groundwater and LNAPL by physical and hydraulic barriers; impacts to Silver Bow Creek would be limited.
- Groundwater access and/or use restrictions would be required indefinitely.
- The same type of long-term institutional controls would be required for Alternative 5 as required for Alternative 3. Groundwater access and land use restrictions would be required indefinitely.
- A cap would be required over the treated soils that are backfilled if they do not meet the cleanup goals. It is likely that neither bioremediation nor soil washing can meet the preliminary remedial action goal (PRAG) for the residential scenario of 3 mg/kg PCP in soil.
- Excavating soils and LNAPL at and below the groundwater table may increase the mass of dissolved contamination and could potentially emulsify the oil and water which would make it more difficult to remove the oily phase, and extend the time required to treat groundwater.
- The groundwater treatment systems would be designed to effectively contain the contaminated groundwater and LNAPL by physical and hydraulic barriers; impacts to Silver Bow Creek would be limited.
- Soils beneath the interstate and the water treatment plant would remain in-place under Alternative 5, requiring long-term LNAPL recovery and/or in-situ biotreatment to avoid recontamination of backfilled "clean" soils.

COMPARISON BETWEEN ALTERNATIVE 3 AND ALTERNATIVE 5
MONTANA POLE AND TREATING PLANT NPL SITE

ALTERNATIVE 3
(ARCO Preferred Alternative)

ALTERNATIVE 5
(MDHES/EPA Preferred Alternative)

Reduction of Mobility, Toxicity, or Volume Through Treatment

- Alternative 3 would effectively contain the groundwater plume thereby reducing the potential for contaminants to move off site under current conditions. Alternative 3 also reduces the toxicity and volume of LNAPL and dissolved contaminants in the groundwater through pump-and-treat actions. Approximately 25 to 50 percent of the LNAPL would be extracted from the subsurface and treated.
- The dissolved contaminants in the extracted groundwater would be degraded in the bioreactor and removed by carbon adsorption. Some further degradation of contaminants in the groundwater and saturated soils would occur through enhanced in situ biodegradation.
- Approximately 50 to 75 percent of the LNAPL would be removed under Alternative 5. Flushing beneath the interstate highway, active railway, and EPA's groundwater treatment plant may remove an additional 5 percent of contaminant sources. Even though 85 percent of the LNAPL may be removed under this alternative, the remaining LNAPL will continue to dissolve into the groundwater resulting in PCP concentrations greater than MCLs.
- Treated soils that are backfilled below the water table may become recontaminated by residual LNAPL that would be present at the water surface during excavation and backfill. Although skimmer pumps would be used to remove this LNAPL residual, these pumps are limited in their effectiveness.
- Excavating LNAPL may increase the volume of contaminated soils because there is a high potential for contamination to spread.
- The dissolved contaminants in the extracted groundwater would be degraded in the bioreactor and removed by carbon adsorption. Some further degradation of contaminants in the groundwater and soils would occur through enhanced in situ biodegradation.
- Approximately 80 percent of the contaminated soils would be excavated and treated. Bioremediation and soil washing would likely not meet the PRAG of 3 mg/kg PCP. The treated soils that are backfilled would likely require a cap.

COMPARISON BETWEEN ALTERNATIVE 3 AND ALTERNATIVE 5
MONTANA POLE AND TREATING PLANT NPL SITE

ALTERNATIVE 3
(ARCO Preferred Alternative)

ALTERNATIVE 5
(MDIHES/EPA Preferred Alternative)

Short-Term Effectiveness

- Health risk to workers and site visitors is expected to be low due to the short duration of the on-site remedial activities.
- Significant short-term risks are associated with Alternative 5 due to the volume of soils to be handled and the required duration of dewatering and treating these materials.
- There is significant liability associated with the "lake" that would exist on site during excavation below the water table. LNAPL would be present on the open water area, resulting in significantly greater risks in the short-term than Alternative 3.

COMPARISON BETWEEN ALTERNATIVE 3 AND ALTERNATIVE 5 MONTANA POLE AND TREATING PLANT NPL SITE

ALTERNATIVE 3 (ARCO Preferred Alternative)

ALTERNATIVE 5 (MDHHS/EPA Preferred Alternative)

Implementability

- Effective, long term institutional controls are being developed to maintain a cap and restrict certain land uses at the site in the future.
- Excavation below the water table is much more difficult than excavating above the water table because it is difficult to visualize the bottom surface of the hole; the soil behaves like a suspension, instead of a solid; and shoring, sheet piling and/or well point dewatering with flow barriers would be required.
- Cap construction involves a proven technology, which can easily be implemented at the site.
- Shoring and sheet piling will be required during excavation around the active railroad line, the interstate highway and the EPA groundwater treatment plant.
- Groundwater flow modeling is recommended before designing the extraction and recharge systems. Trench construction will be difficult due to flowing sand conditions.
- Groundwater flow modeling is recommended before designing the extraction and recharge systems. Trench construction will be difficult due to flowing sand conditions.
- All soil treatment methods associated with this alternative are technically implementable, however very few full-scale demonstrations of bioremediation and soil washing for the types of contamination at MPTP site have been performed. This additional study will be required during remedial design.
- All soil treatment methods associated with this alternative are technically implementable, however very few full-scale demonstrations of bioremediation and soil washing for the types of contamination at MPTP site have been performed. This additional study will be required during remedial design.
- Estimated duration for soil treatment:
3B (Bioremediation) - 2 years
3C (Soil Washing) - 1 year
- Estimated duration for soil treatment:
5B (Bioremediation) - 10 years
5C (Soil Washing) - 4 years

COMPARISON BETWEEN ALTERNATIVE 3 AND ALTERNATIVE 5 MONTANA POLE AND TREATING PLANT NPL SITE

ALTERNATIVE 3 (ARCO Preferred Alternative)

ALTERNATIVE 5 (MDHES/EPA Preferred Alternative)

Cost

- Estimated Cost

 - 3B (Bioremediation) \$21.0 to \$36.6 million
 - 3C (Soilwashing) \$27.7 to \$43.8 million
- Costs are based on volumes of soils, groundwater, LNAPL, equipment, and debris estimated for the RI
- The actual volume of media requiring treatment may be somewhat higher. In particular, the EPA action, which was implemented in 1992 after the RI, has generated contaminated soils and LNAPL that have not been included in these costs.
- Cap construction is a proven technology, therefore it is not anticipated that costs will vary significantly for this portion of the remedy.
- Estimated Cost

 - 5B (Bioremediation) \$27.5 to 55.2 million
 - 5C (Soilwashing) \$48.1 to 78.2 million
- These costs do not include capital and O&M for the soil flushing systems required to remove LNAPL in inaccessible soils beneath the interstate highway, the active railway line and EPA's groundwater treatment plant.
- Costs are based on volumes of soils, groundwater, LNAPL, equipment, and debris estimated for the RI. The actual volume of media requiring treatment may be substantially higher. Experience with remedial activities involving excavation shows that actual soil volumes can be 50 to 100 percent higher than anticipated.
- Very limited experience in LNAPL excavation at other superfund sites indicates that costs may be considerably higher than estimated above due to implementability problems described previously.

John W. Ray

Given the fact that the investigation of the health threat posed by the contaminants present at the Montana Pole Plant Superfund Site rest on a baseline risk assessment the threat is probably underestimated. The reason for arguing that the threat is underestimated is that health risk assessment only investigates cancer, does not consider the cumulative or the synergistic effects of contaminants, and does not evaluate the secondary and tertiary effects of contamination on human health. For example, it does not evaluate the effect of contaminants on the food chain. PLEASE ALSO REFER TO MY ATTACHED PAPER ON HEALTH RISK ASSESSMENT WITH SHOWS THE LIMITATION SO HEALTH RISK ASSESSMENT.

The purpose of this paper is that we should place limited reliance on Health Risk Assessment which assumes that there is some level of acceptable risk. Rather, prevention of health problems before they occur should be the focus. If there is a serious group of contaminants present, such as those at the Pole Plant, they should be cleaned up to the maximum extent possible. There should be no arbitrary level of contamination permitted.

John W. Ray

SPECIFIC PROBLEMS WHICH ARE ASSOCIATED WITH EPA MOBILE ON-SITE INCINERATORS WHICH MUST BE ADDRESSED:

1. Questionable effectiveness when burning liquid organic sludges which have a proven tendency to become sticky when burned.
2. The frequent replacement of the refractory lining because of the burning of abrasive or corrosive materials.
3. Poor thermal efficiency
4. Air pollution which can result from puffing from the seals
5. The generation of a tremendous amount of particulate matter because of the extreme turbulence caused by the constant turning of the rotary kiln.
6. The fact that round items may actually roll through the kiln before combustion is completed.
7. High operating costs
8. Necessity of constant running due to attempts to avoid shortened life of refractory.
9. Environmental and health effects of operation of incinerator in an inversion area .
10. Incinerators have low public acceptance.

For further information see: Incineration: The Burning Issue (CCHW), Hazardous Waste Incineration and Human Health by Travis and Cook, and Playing With Fire: Hazardous Waste Incineration by Costner and Thornton

The purpose of Superfund is to clean up hazardous waste sites which are a threat to human health and the environment. Remedies under Superfund should provide a permanent cleanup remedy not temporary containment or simply removal to another site. Simply cleanup is the "act of cleaning up" and the term clean means "pure, free from dirt, contamination, impurities." According to the EPA publication entitled Superfund: Environmental Progress the purpose of Superfund is to achieve "long-term cleanup goals for sites" and to remove "contamination from the environment." p. 1. The document further states that "the law directs EPA to protect public health by meeting strict cleanup standards at each site." and "Reduced to its environmental essence, the New Superfund mission is 'make sites safe, make sites clean, and bring new technology to bear on the problem.'" p. 3. In accordance with Superfund law, the selected remedy for the Montana Pole Site must, to the maximum extent possible, make the site free of contamination. The remedy should be a cleanup remedy. Any remedy short of this goal is not being faithful to Superfund.

The need for cleanup is particularly acute given the serious nature of the contamination at the site. The principal hazardous substances at the site are PCP, PAH, and Dioxin/Furans which can cause cancer, birth defects, skin diseases, weaken the immune system, reproductive disorders, liver disease, and kidney disease. Dioxin is generally considered to be one of the most toxic substances known to man. The MDHES has correctly concluded that "there are excessive human health cancer risks and excessive noncancerous health hazards associated with hazardous substances at the site. Actual or threatened releases of hazardous substances from this site, if not addressed by cleanup, may present a current or potential threat to public health, welfare or the environment." (Proposed Plan: Montana Pole Superfund Site, May 1993, p. 6)

Unfortunately, past Superfund efforts have not met the goal of cleanup. The Office of Technology Assessment (OTA) has concluded that Superfund "remains largely ineffective and inefficient" and "is not working environmentally." OTA also has concluded that the Superfund program has too often settled for remedy technologies which would not reduce the "toxicity, mobility or volume" the hazardous waste. All too often Superfund has settled for remedies short of cleanup. Given the serious nature of the contaminants at the Montana Pole Site we cannot allow any remedy short of cleanup. We must insist that the site be made free of contamination. We must clean up the problem so that future generations don't have to deal with it.

If we are to meet the goal of actually cleaning up the Pole Plant Site it is obvious that only Alternatives 5 B, and C should be considered. Alternatives 1-4 would settle for less than cleanup and therefore should automatically be discarded. Only Alternatives 5 B and C really address the nine criteria for evaluating cleanup alternatives, particularly the two threshold criteria of protecting public health and the environment and compliance with applicable or relevant and appropriate requirements. Given available information only Alternative 5 B, the preferred alternative, fully meets the nine criteria particularly the two threshold criteria. Alternative 5 B would address all actual and potential sources of contamination with a view to cleaning up these sources. Alternative 5 B would offer maximum protection for public health and the environment, it most fully complies with applicable or relevant and appropriate requirements, it provides both short and long term effectiveness, it actually does clean up the site by reducing toxicity, volume, and mobility of the hazardous waste present, it is implementable, cost effective, has state agency acceptance, and would be most acceptable to the community.

I have deliberately left out alternative 5 A because it relies upon on-site incineration to clean up the site. Incineration has several severe negative consequences which call for its rejection as a suitable cleanup alternative.

HERE REFER TO MY ATTACHED PAPER ON INCINERATION AND MY
ATTACHED PAPER ON EPA MOBIL INCINERATORS.

Next, I would ask you to apply the test of critical scrutiny to any claims by PRPs that they can't clean up the site. Ask the simple question: Is their primary concern protecting the public health and the environment or is their primary concern protecting corporate profits? Doing little or nothing will obviously cost the PRPs less than cleaning up the site. Nevertheless, the mission of MDHES and EPA is not to protect corporate profits but to protect the public health and to protect the environment. If one looks at all nine alternative selection criteria, cost is only one and obviously secondary to coming up with a cleanup alternative which effectively cleans up the site.

TWO FINAL CONSIDERATIONS:

1. THE CONTAMINATION UNDER THE HIGHWAY MUST BE ADDRESSED. If cleanup is the goal, a possibly significant source of future contamination such as that under the highway must be addressed.

2. MORE ATTENTION MUST BE PAID TO INNOVATIVE TECHNOLOGIES, WHICH IS A SUPERFUND GOAL, FOR POLE PLANT CLEAN UP SUCH AS:

A. Use of ultraviolet light to speed up oxidation of toxic organic wastes particularly in combination with ozone and hydrogen peroxide.

Photochemical decomposition and photocatalytic oxidation detoxification process. See: Aero-Sun Times Winter/Spring 1989. More attention to solar.

B. Vitrification (Assuming no incineration problems present), C. Use of advanced electric reactors. (Assuming no incineration problems present.), D. Supercritical water, E Vacuum Extraction, and F. Ion exchange systems.

Submitted by: John W. Ray 915 West Galena St, Butte, Montana

The logical method and form flatter that longing for certainty and for repose which is in every human mind. But certainty generally is illusion, and repose is not the destiny of man.

Oliver Wendell Holmes (Harvard Law Review 39 (1897))

Public health concerns are usually at the center of most environmental problems. Determining the health risk of environmental pollution is no easy task for it calls for a collaborative blending of medicine, science, engineering, economics and politics—not an easy alliance. Health Risk Assessment is the tool usually used by both government and industry as a supposedly neutral, scientific approach to quantify environmental risks to public health. The goal of Health Risk Assessment is to establish "acceptable" health levels of pollution exposure which levels then serve as critical standards of judgment for continuing or proposed projects. However, Health Risk Assessment is not a neutral or a scientific tool, but is inherently biased and political in its nature.

(1) Health Risk Assessment is a subjective, arbitrary, and discretionary political process, rather than an objective and scientific activity. As such, it cannot guarantee that the public health will be protected. Where the acceptable level of exposure is drawn and what constitutes a public health risk depends entirely on who is doing the study. Alvin Alm of the Environmental Protection Agency in Advances in Health Risk Assessment for Systemic Toxicants and Chemical Mixtures comments that: "Risk assessment is not strictly a scientific procedure. Questions of personal politics and of what might be called scientific ideology arise constantly. The process of assessing risk is inherently uncertain. . . because the results depend heavily on the procedures and assumptions used. This inescapable fact gives rise to fears that those procedures and assumptions can be juggled for political

ends." (Princeton Scientific Publishing Company, Inc. 1985, p. 2.) Walter Rosenbaum of the University of Florida notes: "Discretionary judgment also permeates the process of determining acceptable risks, which invites pressures and counterpressures from contending sides struggling to influence official decisions to their advantage. The language of the law may conceal it, but determining acceptable risk is ultimately an intensely political affair." (Environmental Politics and Policy, Congressional Quarterly Press, 1991, p. 156.) For example, Rosenbaum points out how standards of acceptable risks changed from strict standards, designed to provide maximum protection for the public's health, during the Carter administration to much more lenient standards of risk, which allowed higher levels of public exposure to dangerous chemicals, during the Reagan /Bush administration. Each position had its own set of expert scientists to support it. (Rosenbaum, p. 162) The point is that, depending upon what scientists one consults, the results differ. The cause of these differences is that there exists expert uncertainty as to what compromises human health and that there are a multitude of risk criteria all of which yield different and contradictory results. William Ruckelshaus, the former administrator of the EPA gave a salient example of the discretionary and arbitrary nature of the risk assessment process: "I just had an eight-hour briefing on fine particulate standards. . . .Our scientists told me we can defend any standard between 150 and 250 parts per million. So pick a number." (Rosenbaum, p. 142.) We should not hold our health hostage to an arbitrary and subjective political process.

(2) Health Risk Assessment does not exclude the bias and prejudice of those doing the study. It is estimated "that in a normal risk assessment around 50 opportunities exist for. . . scientists to make discretionary judgments." (Rosenbaum, p. 153.) A study by political scientists Thomas M. Dietz and Robert W. Rycroft, who interviewed some 228 health risk assessors, found that "place of employment is

significantly linked to differences in . . . the use of both risk and cost-benefit analysis" and that the health risk process is characterized by "a weakening of disciplinary perspectives and a strengthening of viewpoints based on politics and ideology." (The Risk Professionals, (Russell Sage Foundation, 1987, p. 111.) Physicist Harvey Brooks observes: "The more an issue is in the public eye, the more expert judgments are likely to be influenced unconsciously by preexisting policy preferences or by supposedly unrelated factors such as media presentation, the opinions of colleagues or friends or even the emotional overtones of certain words used in the debate." ("The Resolution of Technically Intensive Public Policy Disputes," Science, Technology and Human Values, Winter 1984, p. 40.) (Similar conclusions about the arbitrariness of health risk assessments have been reached by the National Research Council, Commission on Life Sciences, and the Committee on the Institutional Means for Assessment of Risks to Public Health.) There is no way to prevent this social, economic, and political bias from entering risk assessment. A socially neutral science in the realm of health risk assessment is a myth. When there is ambiguous or mixed data, "experts often will select the viewpoint congenial to their political, social, or economic convictions." (Rosenbaum, p. 162.) Such arbitrariness cannot guarantee that the public health will be protected. We should not hold our health hostage to a process that inherently includes the biases of those doing the study.

(3) Risk assessment does not guarantee that significant reduction of pollution will occur in the environment.

The goal of environmental regulation should be the eventual elimination of environmental pollution and resultant threats to public health. The National Environmental Policy Act (NEPA) has as its purpose: "to prevent or eliminate damage to the environment and to promote health." If we are to be true to the intent of NEPA to protect the public's health, we should

significantly minimize, if not eliminate, public exposure to toxic pollutants. The goal should be the prevention of health problems before they occur. Unfortunately, as we know, health risk assessment can actually sanction the continuation of pollution in the environment through the allowance of so called "acceptable" levels of exposure. This is a particularly pernicious result in that, in many cases, the substances to which people are **involuntarily** exposed such as heavy metals, dioxin, PCBs, etc. pose severe potential health risks. Barry Commoner of Queens College offers this conclusion: "In sum, the original fault embedded in the U.S. system of environmental regulation--that it attempts the inherently futile task of controlling rather than preventing pollution--has itself spawned a series of new faults that erode the integrity of science, the regulatory process, and public policy. The environmental failure has been very costly, not only in money but in burdening the still unsolved environmental crisis with a heavy heritage of poor public policy disguised as science and poor science disguised as policy." (Making Peace with the Planet, Pantheon Books, 1990, p. 78). We should not countenance a method such as Health Risk Assessment which sanctions continued environmental degradation.

The goal of environmental policy should be the prevention of pollution. If a substance is harmful to human health or the environment it should be reduced to the maximum possible limit. Health Risk Assessment is inimical to this goal for it allows for so-called "acceptable" levels of pollution. There should be no acceptable levels of environmental degradation.

John W. Ray

For Record

Issues of Concern Communicated to CTEC

Introductory. Members of CTEC, residents of affected neighborhoods, and the Butte community have participated extensively in the planning and information-gathering and -disseminating process associated with work at the MPTP. Before expressing several concerns that remain, we wish to acknowledge the helpfulness and cooperation of EPA, MDHES, and ARCO participants; they have helped answer our questions, and have clarified many of the murkier issues raised during the search for an appropriate remedy.

1. Recognizing the fact that the interception wall was installed to contain only the LNAPL or floating product, a number of CTEC members have expressed concern that PCP dissolved in the groundwater will continue to move past the interception wall and affect the water quality of Silver Bow Creek. These people wonder whether the amount of PCP loading to the stream has increased since the wall was installed? They feel that the Agency needs to quantify continued contaminant-loading to the stream (over the projected life of the project) under each alternative to compare how well groundwater and surface water quality goals can be met under the different alternatives.

2. There is some concern that the decision at the MPTP may set a precedent for future decisions to be made at other sites in the area (particularly sites located downstream). CTEC has heard from many people in the area that the remedy chosen at MPTP must be consistent with the goals and objectives set both for this site and for all other sites that may have an impact on the stream. While the decision must be capable of meeting discharge water quality goals to Silver Bow Creek, a number of respondents stress that the final decision should reflect currently-known land-use goals at the site, and not a standard for cleanup that far exceeds what is needed for the anticipated uses for the site.

3. Given the technical disagreements between ARCO and MDHES about the agency's preferred remedy, one of the most commonly-voiced concerns is about the permanence of any of the remedies. Even the most aggressive remedy chosen (5B) will leave contaminants bound to the soil below the "smear zone". If the more aggressive (and expensive) treatment plan is chosen, it seems reasonable to expect relatively complete cleanup and a prospect for bringing the site back into productive use for the community. It is hoped that negotiations toward the Record of Decision will resolve the technical differences currently dividing ARCO and MDHES (primarily regarding implementability and cost of the preferred alternative). Otherwise, the public's level of confidence in the permanence of the remedy (and in the viability of the process) will be undermined.

Mel Rouling
President C-TEC

MONTANA POLE RESPONSIVENESS SUMMARY

APPENDIX B

Oral Comments Received During the Comment Period

MEMORANDUM

To: Montana Pole Project Files

From: Brian Antonioli
Project Officer

Date: July 16, 1993

Subject: Oral Comments Received on the Montana Pole Proposed Plan

The following are comments received by phone at our offices during the Montana Pole Proposed Plan comment period which ran between May 7, 1993 and July 7, 1993:

Commenter #1

My name is Nicki Leiss. I live in Anaconda, Montana, 702 Highway 1 West #5. I'd like to give my comment on the Montana Pole Site. I believe the plans for this site would be a sheer waste if you're going to excavate four feet of soil beneath the water level of the ground table. This cannot be done. There is no technology for this. It is better just to remove the soil down to the groundwater level and clean the soil. Also, I think it is a better idea if you covered the site with grass or shrubbery, flowers, and in other words make it sort of like a park which would take care of the leaching effect which forms of moisture may have on this contaminated soil. Thank you. Good-bye.

Commenter #2

My name is Wanda Johnson and I live in Butte, and I have read some information on cleaning up the Montana Pole Site and I believe that ARCO should go ahead and be responsible for cleaning up the whole situation right now instead of building a plant and doing it long term.

Commenter #3

This is Don Stoeker. I'm on the board of the Clark Fork Pend Oreille Coalition. I'm also vice-president of the Audubon Society and of course both organizations are concerned with what happens with the Clark Fork River and especially with the Silver Bow Creek which is headwaters and where most of the pollution is coming from. On the Pole Plant issue I am quite concerned about some of the things that are mentioned in alternatives and the plan of how to eliminate these tailings. Of course, I would like to say, and everybody that I know of, personally would like to see these tailings completely removed as much as possible. I don't mean the tailings, I mean the contaminants in the Pole Plant. It mentions then the program, I mean how they're going to excavate

July 16, 1993

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these contaminants. They are going to take the first two or three or four feet but most of the contaminants are the sludge, and treat these with some chemicals or a process, and that would take, I don't know, two or three months or whatever, and then put them back in to where they excavated. Now, I myself, I really don't care much for putting them back so quick. I would like to see the whole thing excavated out clear the whole length of it to Silver Bow Creek and this may not be possible because there may not be enough room to store these contaminants, but I would like to see this area left open at least over one winter so it can flush out. I think that if left open it would be able to flush out a lot better than if the soil is put right back in right away even though there will be pumps in it. But when the area's left open, the water can be more free running and therefore, I believe can be flushed out a lot better and help. If anything's left in there that maybe not even may not show up or it can be flushed out. Of course, these pumps should still be in place down through the center and at the lower end. But if this isn't possible, to store all these contaminants, of course I mean if you don't have room, well, if you have to fill it back in, I would suggest maybe putting some drain tile, like a big drain pipe maybe a couple of feet or smaller in diameter so the water can drain into those drain pipes and then drain out. So you have an open area there because they do a lot of this in sort of wetland areas and so on. Fact is, I saw a lot of farmland that's farmed today because they had these drain tile type of things and I think it would help flush it out a lot better, a lot faster and maybe not have to wait a minimum of thirty years or a hundred years on down the road to really help completely clean this mess up.

On the bridge under the interstate the soil should be completely removed there taken out. You know, it would only have to be half of the interstate at a time of course, because the interstate would have to be removed anyway, that's certain, twenty feet, twenty-five feet or so where those contaminants are on the end of the bridge. Flushing it out like they were saying with water under pressure or however they intend to do it - I don't quite understand it - I just don't think it would be a complete clean-up myself. I think the soil ought to be completely removed and maybe thrown in with the Colorado tailings and brought down here to Opportunity and then refill it in with good material of some sort. I know that would block the interstate for a while but you completely remove those soils altogether, well, I don't think that would take that much time, as much time maybe as even to flush it out.

So this is some of my main comments right at the moment. So I am quite concerned about the length of time it would take to clean this mess up, this pole plant, and my main concern of putting those soils back in right away. And of course, when you, I think they ought to start at the bottom end of the pole plant down towards Silver Bow Creek and work their way up. Because you take some of that water out, I don't know what the pressure is underneath of

July 16, 1993

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there or so, I mean Brian may know and some other individuals. You dig a hole where there's running water underneath if it is quite runny even seeping in, well, may come up. You're always working in a bunch of mud. You do one section, you might have to put a dike in there and so on, and I think that might expend the cost of the project. You start at the lower end, I don't think there's going to be quite as much problems as there would be if you start at the upper end. I could be mistaken about this but that's just sort of the way I see it from previous experience with digging holes and wetland area and water coming up and so on and areas I've seen on different ranches and so on like that where people's excavated springs and so on to get the water flowing better for livestock and that type of thing. So I guess that's about the extent of my comments. I may think of some a little bit later and then I'll put those in written comments and send them in through the mail. Thank you.

MEMORANDUM

To: Montana Pole files

From: Brian Antonioli
Project Officer

Date: May 10, 1993

Subject: Proposed Plan comments

The following comments were given to me by telephone around 2:15 p.m. on May 7, 1993 concerning the Montana Pole Proposed Plan. The commentor did not identify himself.

The commentor stated that we should put the creek in a pipe to divert it around this area and then let nature take care of itself. We shouldn't dig it up. That would create a bigger problem than there is already. We could pipe the creek all the way to Deer Lodge if needed.

MONTANA POLE RESPONSIVENESS SUMMARY

APPENDIX C

Written Comments Received During the Comment Period

BROWNING, KALECZYC, BERRY & HOVEN, P.C.

ATTORNEYS AT LAW

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JON METROPOULOS
MARCIA D MORTON
SHARON A O'LEARY**
LEO S WARD

*MEMBER OF WASHINGTON STATE
AND OREGON STATE BARS ONLY
**MEMBER OF NEW YORK STATE BAR
ONLY

July 7, 1993

JUL 07 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

Mr. Brian Antonioli
Solid and Hazardous Waste Bureau
Montana Department of Health and Environmental Sciences
Cogswell Building
Helena, MT 59620

Re: Comments on Montana Pole Superfund Site Remedial
Investigation and Feasibility Study Reports, Baseline Risk
Assessment, and Proposed Plan

Dear Brian:

On behalf of Burlington Northern Railroad (BNRR), we are submitting comments on the above-referenced documents for your consideration and inclusion in the administrative record for the Montana Pole Superfund Site.

The enclosed documents were prepared on BNRR's behalf by Kennedy Jenks Consultants and consist of technical review comments on the Remedial Investigation (RI) and Feasibility Study (FS) reports, prepared and submitted to the Montana Department of Health and Environmental Sciences (MDHES) by ARCO, the Final Baseline Risk Assessment (FBRA), prepared for MDHES by Camp Dresser & McKee (CDM), and the Proposed Plan prepared by MDHES and EPA. As well, our own comments on the RI and FS reports are enclosed.

Our review of these documents reveals that generally EPA guidance was either not followed, or unfortunately was misinterpreted. Accordingly, appropriate regulatory review of remedial alternatives was impossible. Given the comprehensive nature of the enclosed comments, the most pertinent comments bear summarizing here.

- o We are aware of MDHES' arduous efforts to create an accurate and viable database. Thus, we were surprised that the RI report exhibits many discrepancies with its own Appendix L, which reportedly contains the DHES-approved data summaries from the remedial investigation. These should be remedied and a

determination should be made as to what impact this has on the FS, FBRA and proposed plan.

- o Both the RI and FS reports avoid description and identification of the southeast infiltration gallery, constructed by the EPA in 1988 and operated until early 1993, as a source of significant groundwater contamination at the Montana Pole Site. As the enclosed comments elucidate, the evidence clearly identifies this response action feature as contributing to the problems to be eventually remediated.
- o Also disappointing is the Proposed Plan's reliance upon an unjustifiable assumption that the Site could be used for residential purposes. Clearly, Congressional intent and EPA guidelines never mandated or envisioned remediating obvious industrial sites to residential standards.

Although the enclosed comments identify distinct problems with the reviewed documents, we are confident that specified problems are not insurmountable, nor do their corrections compel a lengthy delay in bringing a technically proficient and administratively adequate remedial plan to fruition. If you believe it would facilitate correction and completion of the final documents, we would welcome an opportunity to discuss these comments with appropriate regulatory professionals.

We hope that you will find our comments useful in preparing final documents. If you have any questions concerning these comments, please contact me at your convenience.

Sincerely,

BROWNING, KALECZYC, BERRY & HOVEN, P.C.

By C. A. Laughner

Catherine A. Laughner

cc: Mel Burda

MONTANA POLE & TREATING PLANT CERCLA SITE

REVIEW COMMENTS ON FINAL RI (ARCO, FEBRUARY, 1992)

INTERPRETIVE ERRORS

Page 1-23. Historically, the "drainage ditch that received process wastewater," "water discharged from clarifying tanks," and "where condensate pooled" all refer to the same wastewater ditch system that extended northward from the treating plant. Unfortunately, the report fails to mention the treatment pond (see above comments concerning RI report pages 1-4 and 5-2), or the southeast infiltration gallery, constructed by EPA in 1988. The latter is clearly a source of contamination, as documented elsewhere in the RI report and these comments.

Pages 3-22 thru 3-23. Evidence of groundwater mounding is not necessary to demonstrate the existence of a significant groundwater contamination source upgradient from the former treating plant. RI Figures 4-12 and 4-22 exhibit groundwater contaminant plumes for PCP and PAH, respectively, that originate at the southeast infiltration gallery. These two plumes are not coincident with the upgradient extent of the LNAPL plume (see RI Figure 3-15 and FS Figures 2-16 and 3-3), indicating that a source other than the LNAPL plume contributes to the PCP and PAH contaminant plumes. The RI report also fails to identify surface or subsurface soil contamination (see RI Figures 4-3 thru 4-7) sufficient to serve as the source of the PCP and PAH groundwater contaminant plumes (Figures 4-12 and 4-22). The southeast infiltration gallery, constructed by EPA in late 1988 and operated until early 1993, is clearly another source of site contamination.

INCORRECT SITE BOUNDARIES

Page 1-3 of the RI report indicates that the western site boundary is "approximately 300 feet west of the soil storage buildings." (See also RI Figure 1-3.) However, if the site is defined by the presence of hazardous constituents, then this boundary appears to be misplaced. RI Figures 4-12, 4-16, 4-22 and 4-25 show groundwater contamination extending well beyond this boundary, indicating that major portions of four groundwater contaminant plumes are outside the site as defined. Figure 4-2 of the Final FS report presents a conceptual groundwater extraction system for these plumes under at least Alternatives 4 and 5, so it appears both incorrect and inconsistent to define the site's western boundary in such a limited manner. (See also FS report Section 4.4.2.1.) Why is such significant contamination excluded from the site?

HISTORICAL ERRORS

Page 1-4 of the RI report describes an "unlined drainage ditch" and references Figure 1-3, which is reportedly based upon an August, 1983 EPA airphoto. However, the drainage ditch represented on Figure 1-3 incompletely shows the ditch as it existed during active treating plant operations. In addition, the "on-site sedimentation ponds" described on page 1-4 are not shown on Figure 1-3 and likewise are not visible in the 1983 airphoto. Historical research of treating plant operations, as well as the testimony of the plant's former owner and chief treating engineer, indicate that the pond described in the text was, first, not a "sedimentation pond," but rather a crude treatment pond in which plant wastewater was allowed to separate into water and oil phases. The oil was recovered, while the wastewater presumably evaporated or infiltrated into the ground. And second, the treatment pond was located northwest of the retort building, in the approximate vicinity of groundwater monitoring well GW-2 (see Figure 2-11), not where the sedimentation pond is shown on Figure 1-3. The treatment pond reportedly was constructed in about 1974 and buried in 1980. The origin of the berm and pond visible in the August, 1983 EPA airphoto, and shown on Figure 1-3, is unknown. Photographs taken during EPA's 1985 removal activities appear to show this same berm and pond area being used to store contaminated soils and miscellaneous equipment (See EPA photograph nos. U9029, U8950 and U9543). This berm and pond area presumably was removed during subsequent EPA excavations; they are not visible in a 1986 EPA airphoto.

Page 5-2 of the RI report identifies a "former waste sedimentation pond" as a major source of contamination and references a pond shown on Figure 1-3. This is incorrect. As explained above concerning RI report page 1-4, the pond visible in the 1983 EPA airphoto is not the treatment pond used in treating plant operations prior to 1980. A December, 1975 Montana Department of Transportation airphoto clearly shows the treatment pond described in the RI text, but this is not the pond visible in the 1983 airphoto. Further, the pond visible on the 1983 EPA airphoto is incorrectly placed on RI Figure 1-3.

COMMENTS ON FIGURES

Figures 1-3 and 1-5 have the same August, 1983 EPA airphoto base, yet show the "berm and pond area" and "drainage ditch" somewhat differently. Figure 1-5 more closely matches the 1983 airphoto and thus is more accurate. Accordingly, the following Final RI report figures also should be corrected to match the 1983 drainage ditch and berm and pond locations

shown on Figure 1-5: Figures 1-3, 1-6, 2-2, 2-6, 2-7, 2-10, 2-11, 2-12, 3-1, 3-3, 3-7, 3-10, 3-11, 3-13, 3-14, 3-15, 4-1 thru 4-8, 4-12, 4-13, 4-16, 4-17, 4-20, 4-22, 4-24, 4-25, 4-27, 4-29, 4-31 and 4-33.

Figure 4-12. The eastern limit of the mapped PCP plume is incorrectly shown to include groundwater monitoring well GW-13. All water quality data for this well (Appendix L) indicate PCP concentrations less than the method detection limit. However, a "PCP screening concentration" of 1.61 ug/l was detected in monitoring well W-13. Was this concentration erroneously ascribed to well GW-13? Figure 4-12 should be redrafted.

REVIEW COMMENTS ON FINAL FS (ARCO, MARCH, 1993)

Page 2-1 of the FS report fails to specifically identify the southeast infiltration gallery as a source of groundwater contamination, especially for the dissolved PCP and PAH plumes represented in FS Figures 2-10 and 2-12. This is inconsistent, given that the RI report (Section 5.1.3) identifies releases to the groundwater system from infiltration galleries as a contaminant source. The FS report (see Section 2.2.1) similarly fails to identify the southeast infiltration gallery by limiting discussion to "major sources of contamination from historic MPTP operations." This is inadequate. The feasibility study and the proposed plan presumably address all site contamination, not just that created solely by the treating plant between 1946 and 1984.

Figure 3-3 in the FS report presents an interpretation of the areal extent of the LNAPL plume. However, this map differs from the LNAPL plume map in the RI report (Figure 3-15). Why do these maps differ, and what is the technical basis for this difference?

##

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6 July 1993

Ms. Cathy Laughner
Browning, Kaleczyc, Berry & Hoven
139 North Last Chance Gulch
Helena, Montana 59601

Subject: Review of Remedial Investigation Report
Montana Pole National Priority List Site
Burlington Northern Railroad
K/J 926008.11

Dear Cathy:

In accordance with our Agreement with Burlington Northern Railroad of 15 March 1993 and Work Order No. 11 dated 19 March 1993, enclosed are comments regarding our review of the Remedial Investigation Report for the Montana Pole National Priority List Site dated February 1993. The report was prepared by James M. Montgomery, Consulting Engineers, Inc. for the Atlantic Richfield Company.

If you have any questions regarding the information presented, call us at (206) 874-0555.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

Nathan A. Graves for

Nathan A. Graves
Vice President

NAG/nmh
7nag1

Enclosure

cc: Mel Burda, Burlington Northern Railroad

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JUL 07 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

COMMENTS ON REMEDIAL INVESTIGATION REPORT
MONTANA POLE NPL SITE
K/J 926008.11

MAJOR COMMENTS

1. Numerous comments regarding data inconsistencies were identified in the Remedial Investigation (RI) and summarized in our specific comments (Table 1, attached). Concentration units, sample concentration values, and concentration ranges presented in the RI were inconsistent with Appendix L. A complete review of Appendix L was not performed because the initial copy provided was incomplete. However, the data inconsistencies identified in the initial Appendix L were not corrected in the revised Appendix L. Erroneous data will significantly impact data analyses (i.e., statistical calculations and estimates of the extent of contamination) and could ultimately affect the risk assessment and evaluation of remedial alterations at the site. We recommend that a thorough review of RI data presentation be performed. What is the impact of the corrected data on the data analyses, risk assessment, and feasibility study?
2. Concentrations below detection limits were considered to be zero in concentration for calculation purposes. This is a non-standard method and introduces a bias into the statistical evaluation of the data. What data was used in the statistical evaluation?
3. Solubility of PCP in water is highly dependent on pH. The PCP solubility of 14,000 $\mu\text{g/L}$ presented in the report is not representative of neutral groundwater. Based on a preliminary review of field notes, the pH of the groundwater appears to range from approximately 4 to 8. The effects of this range need to be considered in the estimate of K_{oc} for PCP. In turn, what impact does this pH range have in the data analysis?

4. There are numerous inconsistencies with regard to floating product (LNAPL) in the monitoring wells. It is stated that a floating hydrocarbon layer has never been observed in M-6-87 and M-7-87. Neither of these wells is constructed in such a way that floating product could be observed. The number of wells that contain LNAPL, as well as the observed trends for increasing or decreasing LNAPL levels over time, should be considered in the data analysis.
5. The method used to analyze slug test data appears to be based on a steady state solution for a confined aquifer (Bower and Rice 1976). However, the slug tests prepared during the RI were transient in an unconfined aquifer. If the method used to analyze the slug test data is not appropriate for site conditions, what is the impact on the conclusions drawn concerning contaminant transport?
6. The quality of the analytical data generated during the RI and used in the data analyses, risk assessment, and feasibility study could be suspect. The amount of sample volume listed for the water matrix does not appear sufficient for the laboratory to perform QA/QC analyses (i.e., matrix spike, and matrix spike duplicate for organics). For laboratory QA/QC analyses, 3 liters of sample volume are needed for the following analysis:
 - EPA Method 8040 (phenols)
 - EPA Methods 8280/8290 (dioxin/furan)
 - EPA Method 8310 (PAH)
 - EPA Method 8080 (pesticides/PCBs).

Six liters and three VOA vials should have been submitted for Target Analyte List analyses. Most of the chain-of-custody forms listed only one sample volume for each analysis. A very limited number of chain-of-custody entries

listed two sample volumes. However, this was not sufficient for the laboratory to perform QA/QC analyses on the Montana Pole samples.

SPECIFIC COMMENTS ON REMEDIAL INVESTIGATION REPORT
MONTANA POLE NPL SITE
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	Comment
Report Section	
1.2.3	PCP/Petroleum Recovery System Paragraph 2. "5,864 gallons" should be "5,924 gallons" and "419 gallons" should be "326 gallons" to be consistent with data summarized in Appendix A. Paragraph 3. Reference to Table 1-7 should be Table 1-6. Groundwater Well Installation and Monitoring Paragraph 1. Replace "depth of product" with "depth to product". Appendix F is incomplete. Not all drilling logs are contained in Appendix F. Paragraph 5. No drilling logs are provided in Appendix F for these wells. "Product" was noted as being detected to "several feet below the water table". No information was provided as to the basis for this detection (e.g., visual, analytical, etc.) nor was any backup provided for this interpretation. Reference in parenthesis to W-7 should state W-8.
1.2.4	Paragraph 3. Insert "." after PAHs. Paragraph 10. Replace "A total of 6,283" with "A total of 6,250" to be consistent with page 1-12 and Appendix A. Paragraph 12. Replace "2,060,000 cubic-feet" with "5,000,000 cubic feet". Volume of soil should not be corrected for porosity. Replace "8,400,000" with "7,900,000", or on line 7 replace "900,000" with "950,000". No data was collected to make this evaluation.
2.2.4	Paragraph 4. The number of samples listed as collected on page 2-25 is misleading since it does not represent the actual number of samples collected. For example, 15 test pit (SL) samples were not collected. Fifteen backhoe test pits were excavated, during which 10 surface soil samples and 23 subsurface soil samples were collected. In addition, no test pit (TP series) samples were collected (as is stated in Section 2.2.4.1 - Backhoe Test Pit Sampling).

SPECIFIC COMMENTS ON REMEDIAL INVESTIGATION REPORT

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	Comment
Report Section	
2.2.4.1	Item 3. Were samples collected at 0-0.5' and 0-1' not used to characterize soils? Paragraph 2. This last paragraph states the analytical parameters for the various programs, except borings, consisted of phenols (EPA Method 8040) and total petroleum hydrocarbons (TPH); however, the data appendix only shows pentachlorophenol (PCP) analytical results for the stained and opportunistic surface soil samples, test pit samples, and surface soil grid samples. It would be helpful if the analytical parameters for each soil program were identified in each section (e.g., Stained and Opportunistic Soil Sampling, Surface Water Flow Pattern Soil Sampling, etc.). In addition, a list of all the samples collected during each event would be useful to the reader.
2.2.6.1	Paragraph 7. Section 2.1.8 (referenced in text) does not exist.
2.2.10	Paragraph 3. A better description should be provided for these samples. It is assumed that they were wastewater samples from the lines, collected at manholes; but it is not clear from the information provided.
3.6.2.1	Paragraph 6. Replace ".0007" with ".0070" to be consistent with Table 3-4.
	Paragraph 10. Reference for Bower and Rice (1976) is provided for the data analysis method used for the slug tests. It should be noted that this method is based on a steady-state solution for a confined aquifer. The slug-test is <u>transient</u> and the aquifer is <u>unconfined</u> . These differences in the analytical solution and site conditions should be considered.
3.6.2.3	Paragraph 2. Section 2.3.3 (referenced in text) does not exist. According to the text, a floating product (LNAPL) was evident in 8 of the 39 site monitoring wells measured (Table 3-3). However, Table 3-3 only identifies 6 wells (i.e., W-02, W-04, W-05, W-08, W-13, and W-15) with LNAPL thickness. Should the reference to Table 3-3 be Table 3-8? Paragraph 3. Uncertain as to ranges listed for LNAPL thickness. According to the text, LNAPL thickness ranged from less than 0.01' (wells W-2, GW-11, and GW-16) to 2.19' (W-8). According to Table 3-8 and Appendix A, wells GW-11 and GW-16 do not contain LNAPL. Also there are LNAPL thicknesses greater than 2.19' listed on Table 3-8 and in Appendix A. Over which time frame are the ranges for? Table 3-8 only lists data up to 31 December 1990; Appendix A lists data up to 1992. Paragraph 4. It is stated that a floating hydrocarbon layer has never been observed in M-6-87 and M-7-87. Neither of these wells is constructed such that "floating product" could be observed.

SPECIFIC COMMENTS ON REMEDIAL INVESTIGATION REPORT

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Report Section		Comment
4.0		Paragraph 2. Based on the number of comments regarding inconsistencies with data tables and text, data should be reviewed to provide consistency with the data tables to the text. Summary data tables for groundwater, surface water, liquid/sludge samples, and removed soil were not provided in the Initial Appendix L provided. In addition, benzene and toluene concentrations are missing from data summary tables beginning with sample SS-A15. It would be helpful to the reader if analytical results for each investigation were presented on separate tables and further divided by analytical parameters. Footnotes explaining the qualifiers should also be provided. Paragraph 6. "Concentrations below detection limits were considered to be zero in concentration for calculation purposes." This is a non-standard method and introduces a bias into the statistical evaluation of the data.
4.1.1.1		Paragraph 2. BTEX concentration units listed for sludge samples do not match Table 4-2. Concentration units for samples KS-Comp 1, KS-Comp 2, and MS-D65 should be changed to reflect Table 4-2.
4.1.1.2		Paragraphs 2 and 4. Again, concentration units throughout these paragraphs are not consistent with those listed on Table 4-2. Oil sample concentration units should be changed to $\mu\text{g/L}$ to reflect data on Table 4-2.
4.1.1.4		Paragraph 2. Table 4-3 is referenced in the discussion of organic results. However, this table only lists TCLP extract regulatory limits for inorganics.

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	Comment
Report Section	
4.1.1.7	Concentrations listed in this section do not correlate with Table 4-4. It appears sample MM-D11 on page 1 of Table 4-4 should be a TCLP result since there is a total result on page 2 of which concentrations are cited in this section. The text also states 5 samples were analyzed for dioxin/furans. If this sample is counted as a total dioxin/furan sample, then 6 samples were analyzed. Therefore, the following corrections should be made, some of which are based on the assumptions that sample results for MM-D11 on page 1 of Table 4-4 are for TCLP results, and some to correlate with Table 4-4. What is the impact of these inconsistencies on the data analyses? Paragraph 1. Method detection limits for 2,3,7,8-TCDD should be 0.08 to 0.3 ppb. PeCDD method detection limit should be 0.1 ppb for sample MM-D11 oil phase and 0.4 ppb for sample MM-D11 sludge phase. Paragraph 2. Method detection limit for 2,3,7,8-TCDF should be 0.05 ppb for sample MM-D11 (oil phase) and 0.2 ppb for sludge phase. Paragraph 3. Sample MM-D11 on page 1 of Table 4-4 is referenced as a TCLP extract. Are the units of this sample ppb? Is this sample the oil phase or sludge phase. The concentrations of the oil and sludge phases for sample MM-D11 are switched in some references in the text. Detection limits listed in the text do not correlate with Table 4-4. There are instances where the total dioxin/furan values are cited instead of the TCLP extraction value when discussing TCLP extraction detection limits. Sample SO-708 as discussed in the OCDD method detection limit should be deleted. Sample SO-708 needs to be added to samples considered unusable for OCDD data. Concentration ranges for PeCDD do not correlate with Table 4-4. It is unclear why PeCDD total concentration for sample MO-EMUL-3 (listed incorrectly in the text as MO-EMUL53) is listed in this paragraph. Is the sample result suppose to be a total or TCLP concentration?
4.1.2.6	Paragraph 1. "PCDD" should be "PeCDD".
4.2.1.1	Paragraph 1. Samples SL101B through SL105B were analyzed for phenols by EPA Method 8040, not just pentachlorophenol. Reference to hydrocarbons should be more specific (i.e., TPH or PAHs).
4.2.1.2	Paragraph 1. Figures 4-1A and 4-1B were not provided.
	Paragraph 3. Reference to Table 4-7 should be changed to Table 4-6. The text states that test pit data indicates the presence of kerosene and fuel oils #2, #4, and #6; however, according to the data tables in Appendix L, kerosene and fuel oil #2 were not detected in any of these samples. What is the impact of these inconsistencies on the assessment of contaminant sources and the data analyses? Sample SL-206-C was collected at 0-0.5', not 0-3'.
4.2.1.3	Paragraph 1. Reference to Section 2.4 should be changed to Section 2.2.4 (there is no Section 2.4). Reference to hydrocarbons should be more specific (i.e., TPH or PAHs).
	Paragraph 2. The term "majority of hydrocarbons" is ambiguous.

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	Comment
Report Section	
4.2.1.4	Paragraph 1. Reference to Section 2.4 should be changed to Section 2.2.4 (there is no Section 2.4). Reference to hydrocarbons should be more specific (i.e., TPH or PAHs). Not all results are shown on Figure 4-3. It would be helpful to have a table summarizing all locations, depths sampled, and concentrations of principal constituents detected in order to allow the reader to make independent conclusions. At a minimum, Appendix L needs to be referenced. Paragraph 3. Provide summary statistics for PCP results and, at a minimum, reference Appendix L. Paragraph 5. Insufficient data provided in figures to substantiate conclusions. Need statistical data evaluation support for conclusion. How was the statistical evaluation performed?
4.2.1.5	Paragraph 1. Unclear as to the total number of samples collected and analyzed in this discussion. According to the chain-of-custody records, these samples were analyzed for phenols (EPA Method 8040); PAHs, TPH, and VOCs (EPA Method 8020); and metals. It should be stated that dioxin/furan analysis was performed for only a limited number of samples. It would be helpful to state what samples the concentrations correspond to (e.g., 1,150,000 µg/kg (A14)). According to the data summary tables (Appendix L) the maximum TPH concentration was 55,600 mg/kg (A14) not 9,130 mg/kg. What is the impact of these inconsistencies to the data analyses? Add references to Figures 4-4 through 4-7, as appropriate.
4.2.2	Paragraph 1. Reference to Section 2.4 should be changed to Section 2.2.4.
4.2.2.1	Paragraph 1. Again, only a subset of the data has been provided in figures. At a minimum, need to reference Appendix L. Paragraph 2. Concentrations listed for BTEX (1,862 µg/kg and 8,390 µg/kg) are not identified on Figure 4-7. Uncertain of where these concentrations occurred (what sample location).
4.2.2.2	Paragraph 2. Sample A-18 was collected at 40-44', not 38-41'.
4.2.2.4	Paragraph 5. According to the data summary tables (Appendix L) concentration ranges for TPH were less than 36.1-55,600 mg/kg. The concentration 55,600 mg/kg was detected in a surface soil sample.

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	Comment
Report Section	
4.2.4	Paragraph 1. Unclear on the reference to 23 surface and subsurface soil samples. According to the data summary tables and Table 2-16, 86 soil samples (consisting of 24 surface and 62 subsurface) were collected and analyzed for Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), and Zinc (Zn). What is the impact on the data analyses? Paragraph 2. Maximum concentrations are not consistent with Appendix L. According to data summary tables (Appendix L): • Maximum arsenic concentration is 356,000 $\mu\text{g/kg}$ (Sample A-12) • Maximum cadmium concentration is 3,310 $\mu\text{g/kg}$ (Sample A-4) • Maximum copper concentration is 1,140,000 $\mu\text{g/kg}$ (Sample A-12) • Maximum lead concentration is 264,000 $\mu\text{g/kg}$ (Sample A-12) • Maximum zinc concentration is 1,720,000 $\mu\text{g/kg}$ (Sample A-4). Paragraph 3. Lead concentration should be Pb (not P^6). Again, maximum concentrations are not consistent with data tables: • Maximum arsenic concentration is 220,000 $\mu\text{g/kg}$ in Sample A-12 (29-32') • Maximum cadmium concentration is 3,270 $\mu\text{g/kg}$ in Sample A-4 (6 to 8') • Maximum chromium concentration was detected in the soil sample collected at 3 to 5' interval (not 2 to 6') • Maximum lead concentration is 1,280,000 $\mu\text{g/kg}$ in Sample A-12 (29-32') • Maximum zinc concentration is 1,720,000 $\mu\text{g/kg}$ in Sample A-6 (6 to 8') • Maximum concentration for copper not identified. What is the impact of these inconsistencies on the data analyses? Paragraph 4. The solubility of PCP in water has been shown to be highly dependent on pH. A solubility of 14,000 $\mu\text{g/L}$ is not representative of a neutral groundwater. Paragraph 5. According to Figure 4-13, PCP concentration for sample M-6 is <20.8 $\mu\text{g/L}$ (not 20.8 $\mu\text{g/L}$). In addition, the concentrations for wells M-8, M-7, and M-6 were obtained during Round 1 (not Round 2) according to Figure 4-13. Paragraph 9. Reference to "Figure 3-8" should be "Figure 3-15."
4.3.2	Paragraph 1. 2,3,7,8-TCDD concentration for well W-2 is 13.07. Paragraph 2. Total hydrocarbon concentration in well W-15 is 6,500 mg/L (not 6,050 mg/L) according to Figure 4-17.
4.3.3.1	
4.3.4	

SPECIFIC COMMENTS ON REMEDIAL INVESTIGATION REPORT
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	Comment
Report Section	
4.3.8.1	Paragraph 1. What about the concentrations detected in the other wells? According to Figure 4-27, arsenic was detected in well M-5 at a concentration of 129 µg/L. What is the impact on data analyses?
4.3.8.2	Paragraph 1. Well SS-25 should be changed to GS-25.
4.3.8.6	Paragraph 1. According to Figure 4-33, zinc was also detected in well M-7 at a concentration of 75.0 µg/L.
4.4.2	Paragraph 1. PAH concentration of sample SW-007 was 0.3 µg/L. Was this concentration not listed because the detection limit was 2 µg/L?
	Paragraph 2. According to Appendix L, the PAH concentration for sample SD-004 is 3.77 µg/kg. The sample result listed (95.4 µg/kg) is the duplicate sample result. What is the impact of this inconsistency on the data analyses?
4.4.4	Paragraph 2. Total arsenic and lead concentrations are not consistent with Figure 4-37. According to the figure, arsenic concentrations ranged from 12.9 µg/L (SW-006) to 15,000 µg/L (SW-002), and lead concentrations ranged from <5 to 30.3 µg/L (SW-005). What data are correct and was the correct data used in the data analyses?
	Paragraph 4. Arsenic concentration ranges are not consistent with Figure 4-38. According to the figure, arsenic concentrations ranged from 70,400 (not 70,200) to 842,000 µg/kg.
4.4.6	Paragraph 2. The BTEX concentration 3.83 µg/kg for sample SD-005 is not consistent with Appendix L. According to Appendix L, BTEX was not detected in the sample.
4.4.7	Paragraph 3. No conclusion can be drawn relative to the backfill around the sewer lines acting as preferential conduits for flow. No data was collected to make this evaluation.
5.1.1.1	Paragraph 1. Reference that "spillage of product from these (two retorts and two butt treatment vats) has been reported," with reference to Section 1.2.2. No mention is provided in Section 1.2.2 of any spillage from the western vat.
5.2.1.1	Paragraph 6. Refers to "hydrodynamic dispersion" as a "physical process that spreads out chemicals primarily <u>perpendicular</u> to the direction of flow." Dispersion occurs in both the longitudinal and transverse directions. Longitudinal dispersion (D_L) is that component of dispersion in the direction of bulk flow. Transverse dispersion (D_T) is that component of dispersion normal (not perpendicular) to the direction of bulk flow. Of these two components, D_L is generally much larger than D_T . Therefore, it is incorrect to state that hydrodynamic dispersion spreads out chemicals primarily "perpendicular to the direction of flow."

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	Report Section	Comment
5.3.1	Paragraph 1. Equation should read $V = \frac{KI}{\phi_e}$ where ϕ_e = effective porosity. ϕ is a symbol used for moisture content not porosity. Paragraph 4. Replace "10" with "11". 1200/110 $\approx$ 10.9 Paragraph 5. Replace ".0007" with ".007" to be consistent with Table 3-4. Paragraph 2. Replace "P_b" with "e_b" and $K_D = K_{oc} \times OCC$ Paragraph 8. The pH of groundwater is not summarized in this RI. Based on a preliminary review of field notes provided in Appendix B, the pH of the groundwater appears to range from approximately 4 to 8. The effects of this range of pH values should be considered in the estimate of K_{oc} for PCP. Paragraph 10. Replace "18.6 to 400,000" with "13.4 to 282,000"; "400,000" with "282,000"; and "4.6" with "6.1". See comment concerning Table 5-2. Paragraph 11. Replace ".00075 to 15 ft/year" with ".0004 to 8.2 ft/year"; and "33.4" with "18.1". See comment concerning Table 5-2. Paragraph 11. Replace "150 ft/year" with "110 ft/year"; and "6 years" with "11 years". See page 5-15, paragraph 1. Paragraph 12. Replace ".0007 ft/ft" with ".007 ft/ft". Paragraph 14. Unclear as to the reference to the measurement of LNAPL in 8 of 39 monitoring wells. Not all wells are constructed such that LNAPL could be observed, if it were present. What is the impact of the inconsistencies in this section on the data analyses?	
6.3.1		
6.3.2	Paragraph 2. The solubility of PCP in water is highly dependent on pH. A solubility of 14,000 $\mu\text{g/L}$ is not representative of neutral groundwater.	

SPECIFIC COMMENTS ON REMEDIAL INVESTIGATION REPORT
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	Comment
Tables	
2-3	The amount of sample volume listed for water matrix does not appear sufficient for the laboratory to perform QA/QC analyses (i.e., matrix spike, and matrix spike duplicate for organics). For laboratory QA/QC analyses, 3 liters of sample volume are needed for the following analysis: • EPA Method 8040 (phenols) • EPA Methods 8280/8290 (dioxin/furan) • EPA Method 8310 (PAH) • EPA Method 8080 (pesticides/PCBs). Six liters and 3 VOA vials should have been submitted for Target Analyte List analyses. Most of the chain-of-custody forms listed only 1 sample volume for each analysis. A very limited number of chain-of-custody entries listed 2 sample volumes. However, this was not sufficient for the laboratory to perform QA/QC analyses on the Montana Pole samples.
2-11	Well PW-65-04 should be PW-GS-04.
2-13	Were both dioxin test methods (i.e., EPA Methods 8280 and 8290) used and why?
2-14	Should cite which CLP Statement of Work was used.
2-16	Numerous typing errors for sample depths were listed on this table: • SL202C 0-3, 3-6 (not 306) • SL206C 0-0.5 (not 0-0,5) • SL207C 2.5-3.5, 6.5-7.5 • SL214C 0-1.5, 1.5-3.
2-23	Reference to analytical method WYS 310.3 for TPH analyses should be NYS 310.3.
3-5	Unclear as to the reference of well 2-16. This well was not previously discussed, nor listed as a monitoring well in the RI. Should this well be W-16?
3-7	Hydrocarbon Sacn should be Hydrocarbon <u>Scan</u> .
3-8	Unclear as to the reference of well R-4. This well was not previously discussed or listed as a monitoring well in the RI.

SPECIFIC COMMENTS ON REMEDIAL INVESTIGATION REPORT

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	Comment
Tables	
4-2	TCLP pesticides should be TCL and TCLP pesticides. The TCL pesticides include aldrin and 4,4-DDT. TCLP pesticides include heptachlor, heptachlor epoxy, and methoxychlor. The concentration unit for TCLP is $\mu\text{g/L}$. Heptachlor concentration (299 $\mu\text{g/L}$) in separator oil recovered samples is not identified in Section 4.1.1.6 - Is this a typing error?
4-3	Maximum allowable concentrations for what? The regulatory criteria should be cited.
4-4	Should sample MM-D11 on page 1 of this table be a TCLP result (see comments under Section 4.1.1.7)? Are the units of this result ppb? Is this sample the oil phase or sludge phase? Section 4.1.1.7 and this table do not correlate.
4-10	This table refers to subsurface soil samples; however, the maximum concentrations listed for PCP and TPH were detected in surface soil samples. The lower concentration range for PCP is 38.1 (not 0.0381). Maximum BTEX concentration listed on Figure 4-7 is 7,440 $\mu\text{g/kg}$ (not 7,400). Uncertain as to how BTEX values were calculated. Were all xylene isomers (i.e., meta, ortho, and para) added together? It appears one isomer, either meta or para xylene, was not included in the BTEX concentration values. "Average" concentration probably is not a meaningful statistic given likely "non-normality" of data. Also, since concentrations are reportedly depth dependent, a depth dependent statistical summary should be provided. What is the overall impact of these comments on data analysis?
4-12	Again, alternative to "average" conditions should be considered.
4-13	Concentration units for PCP, PAH, and TPH results should be included on table. PCP concentration listed for well N-1 of U 1.48 $\mu\text{g/L}$ is not consistent with Figure 4-14. TPH concentrations for NE-1 (0.509) and NE-2 (3.24) are not consistent with Figure 4-18. According to Figure 4-18, concentrations are 0.359 mg/L (NE-1) and 0.3 mg/L (NE-2). PAH concentrations for offsite wells are not consistent with Figure 4-21. Well PS-65-04 should be PW-GS-04. Footnote A, which references Figure 2-7A, should reference to Figure 2-7. In addition, according to Section 2.2.6 paragraph 7, 12 offsite monitoring wells were sampled during Round 3. Why aren't analytical results for wells GS-18, GS-22, GS-25, and BMW-9A shown on this table?

**SPECIFIC COMMENTS ON REMEDIAL INVESTIGATION REPORT
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	Comment
Tables	
5-2	Incorrect calculations. Assuming the K_{ow}, K_{oc}, and K_D values are appropriate (note earlier comment in Section 5.3.2 regarding K_{oc} of PCP), the following replacements should be made: • "18.6-223" with "13.4-164" • "2.6-30" with "0.7-8.2" • "601-400,000" with "423-282,000" • ".0015-1.0" with ".0004-.26" • "8.2" with "6.1" • "33" with "18.1" • "2.2-19.9" with "1.5-8.9" • "5.50-50" with "12.4-74". Footnote d, i.e. ϵ_b, replace ϵ with σ, where σ = porosity. Equation for retardation is based on porosity, not effective porosity. Using $\sigma = 0.32$ (as defined on page 5-14) and using the correct equation $\epsilon_b = (1 - \sigma) \cdot \epsilon_p \cdot \epsilon_b = 1.80 \text{ g/cm}^3$. This affects calculations of R and effective velocity (v/R), as corrected in comments above. What is the impact of these issues on data analyses? Footnote e, replace "e" with "e" in footnote.
Figures	
1-9	Incorrect scale "0.50(7), 200"
2-7	The labeling of wells does not appear consistent with text. For example, wells GS25 and GS17 are identified as monitoring wells installed for the RI/FS. Aren't these offsite monitoring wells? Locations GS12/A12 and GW21/A21 are identified as monitoring wells installed for the RI/FS. Aren't these locations a monitoring well and boring location.
2-11	Unclear as to the difference between a monitoring well/boring location and a monitoring well/subsurface boring location.

SPECIFIC COMMENTS ON REMEDIAL INVESTIGATION REPORT

MONTANA POLE NPL SITE

K/J 926008.11

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	Comment
Figures	
2-13	Unable to read print on figure (type too small). In addition, some figures (e.g., Figure 3-11, 4-1, 4-3, 4-6, etc.) contain so much information that it is very difficult for the reader to decipher the information. Many of the figures are difficult to read because so many sampling locations are presented on the figure. It would be helpful to the reader if the figures were 11"x14" in size or the information was presented on several figures instead of all on one figure.
3-15	The data presented on the figure are not consistent with Table 3-3. According to Figure 3-15, data are listed for the dates 11/90 and 06/91. However, the 06/91 data correlates to the data listed for 2 July 1990 on Table 3-3. Should the value for W-5 be 0.65 or 0.63 (feet)? What is the impact on data analysis?
4-1	Typing errors on sample locations: SLO12B should be SL102B, SLO13B should be SL103B, and SL105A should be SL105B. Sample SLO10A is identified with a surface water pattern sample symbol.
4-3	Numerous errors were noted on this figure: • Sample locations are mislabeled (e.g., sample location SL106A should be sample SLO16A, sample location SL102A should be sample SLO12A) • Concentrations listed are inconsistent with Appendix L data tables: - TPH concentration for sample SL104B should be <35.3 mg/kg - TPH concentration for sample A13 should be <71.8 mg/kg - TPH concentration for sample A14 should be 55,600 mg/kg - TPH concentration for sample SL102B should be <37.1 mg/kg - TPH concentration for sample SL201C should be <11,500 mg/kg - TPH concentration for sample SL103B should be <34.7 mg/kg • Reference to Figure 2-1 in the footnote should reference Figure 4-1.

SPECIFIC COMMENTS ON REMEDIAL INVESTIGATION REPORT
MONTANA POLE NPL SITE
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	Comment
Figures	
4-4	Number of errors were noted in this figure. Was the correct data used in the data analyses? • Sample concentrations are inconsistent with Appendix L data tables. • PCP concentrations for sample A15 (16-20') should be <119 $\mu\text{g/kg}$. • PCP concentrations for sample A21 (10-14') should be <120 $\mu\text{g/kg}$. • PCP concentrations for sample A13 (0-2') should be <108 $\mu\text{g/kg}$. • Depth (3-12') for sample A16 should be 8-12'. Figure does not show all sample concentrations for sample A13 (missing concentrations for samples collected 10-14', 18-22', and 22-26'), A14, A15, and A16. • Reference to Figure 2-1 in the footnote should reference Figure 4-1. • Reference to Figure 2-3 in the footnote should reference Figure 4-3. • Reference to concentrations above 10,000 $\mu\text{g/kg}$ should be clarified since sample concentrations less than 10,000 $\mu\text{g/kg}$ are presented in this figure.

SPECIFIC COMMENTS ON REMEDIAL INVESTIGATION REPORT

MONTANA POLE NPL SITE

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	Comment
Figures	
4-5	Numerous sample concentrations presented on the figure are inconsistent with Appendix L data tables. What is the correct data and what data was used in subsequent analyses? • TPH concentrations for sample A4 (6-8') should be 2,840 mg/kg • TPH concentrations for sample A2 (0-2') should be 5,650 mg/kg • TPH concentrations for sample A2 (4-6') should be 45.9 mg/kg • TPH concentrations for sample A8 (0-2') should be 1,600 mg/kg • TPH concentrations for sample A8 (6-8') should be 3,590 mg/kg • TPH concentrations for sample A8 (12-14') should be 4,340 mg/kg • TPH concentrations for sample A8 (41-43') should be 87.1 mg/kg • TPH concentrations for sample A3 (0-2') should be 2,090 mg/kg • TPH concentrations for sample A3 (6-8') should be 1,520 mg/kg • TPH concentrations for sample A15 (0-2') should be 259 mg/kg • TPH concentrations for sample A15 (4-8') should be 2,330 mg/kg • TPH concentrations for sample A16 (8-12') should be 3,480 mg/kg • TPH concentrations for sample A16 (14-18') should be 805 mg/kg • TPH concentrations for sample A16 (18-22') should be 104 mg/kg • TPH concentration for sample A16 (22-26) should be 153 mg/kg. • TPH concentration for sample A21 (0-2') should be 724 mg/kg. • Concentrations for A13 should be (0-2') <71.8 mg/kg; (2-6') 4,130 mg/kg (6-10') 71.6 mg/kg (10-14') <84.2 mg/kg. • Concentrations for A14 should be (0-2') 55,600 mg/kg; (2-6') 5,760; (6-10') <84.1; (10-14') <81.8. Sample concentrations for all depths are not shown for sample locations A13, A14, A15, and A16.
4-6	It is not standard practice to indicate concentrations less than detection limits by a value of 0. PAH concentrations are not listed for samples A1 and A4. Concentrations for A13 and A14 should be switched. Reference to Figure 2-1 in the footnote should reference Figure 4-1.
4-7	It is not standard practice to indicate concentrations less than detection limits by a value of 0. Uncertain of how BTEX concentrations were obtained. Data tables in Appendix L list concentrations for meta-xylene, ortho-xylene, and para-xylene. However, concentrations presented in Figure 4-7 appear to be omitting either the meta- or para-xylene concentrations. Could the laboratory distinguish between meta and para xylene concentrations? BTEX concentrations are not consistent with data tables. Sample concentration for A12 (0-2') should be 2 µg/kg. Sample concentrations for samples A3 and A13 should be switched.

SPECIFIC COMMENTS ON REMEDIAL INVESTIGATION REPORT
MONTANA POLE NPL SITE
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	Comment
Figures	
4-9	This figure does not list all sample concentrations for varying depths (e.g., concentrations for boring A14 at depths of 14-18' (259 µg/kg), 18-22' (240 µg/kg), and 22-26' (160 µg/kg) are not shown. The data on this figure are also inconsistent with data tables. Were the correct data used in subsequent analyses. • PCP concentration for sample A14 (26-30') should be 192 µg/kg. • PCP concentration for sample A2 (28-30') should be <36.8 µg/kg. • PCP concentration for sample A21 (10-14') should be <120 µg/kg. • PCP concentration for sample A19 (18-22') should be <244 µg/kg. • PCP concentration for sample A20 (2-5') should be <770 µg/kg. Not all concentrations are shown for borings A16 and A21.
4-10	This figure does not list all sample concentrations for varying depths for borings A13, A14, and A15. The data on this figure are also inconsistent with data tables. • PCP concentration for sample A13 (0-2') should be <108 µg/kg. • PCP concentration for sample A15 (16-20') should be <119 µg/kg.
4-11	The figure does not list all sample concentrations for varying depths for borings A27 and A21. The data on this figure are also inconsistent with data tables. PCP concentration for sample A21 (10-14') should be <120 µg/kg.
4-13	Unclear as to the labeling of wells. According to text (Section 2.2.6, paragraph 7) wells GS-18, GS-22, GS-25, and BMW-9A are identified as offsite monitoring wells. In addition, Figure 4-12 labels wells GS-34, BMW-1B, BMW-10, and GS-17 as offsite monitoring wells. This labeling should be consistent throughout all the figures. Also this figure is called "Groundwater Quality Map of On Site Wells. Why are offsite data results shown? Shouldn't offsite wells be shown on Figure 4-14 (Groundwater Quality Map of Off Site Wells). This same comment applies to Figures 4-17, 4-20, 4-27, 4-29, 4-31, and 4-33.
4-14	Wells are noted with symbol for offsite monitoring well; however, the symbol has been omitted from legend. Why are the concentrations of other offsite wells not listed in this figure? This same comment applies to Figures 4-18, 4-21, 4-28, 4-30, 4-32, and 4-34.
4-17	Concentration for GS-22 should be shown for Round 3.
4-20	Concentration for GS-22 should be shown for Round 3.
4-27	Concentration for GS-22 should be shown for Round 3.
4-36	PAH concentration for sample SD004 lists duplicate sample results. The original sample results (3.77 µg/kg) should be listed.

SPECIFIC COMMENTS ON REMEDIAL INVESTIGATION REPORT

MONTANA POLE NPL SITE

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	Comment
Figures	
4-37	Are some of the concentrations listed on this figure incorrect? For example, was total arsenic detected at sample location SW002 at a concentration of 15 µg/L during Round 2? Was arsenic detected at sample location SW001 at a concentration of 13.9 mg/L during Round 2? Was the detection limit for dissolved cadmium <5.0 for sample SW005 (during Round 2)?
Appendices	
Appendix A	Product Volume Summaries a) For Date 8801, South System, total of 177 provided in summary for South System and 117 provided in summary for both systems. b) For Date 8702, North System, total of 0 provided in individual North System summary and 32 provided in summary for both north and south systems. c) For North System, reading for 02/89 missing. d) For purposes of text summary, records for each individual system assumed to be correct, rather than summary for both systems.

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6 July 1993

Ms. Cathy Laughner
Browning, Kaleczyc, Berry & Hoven
139 North Last Chance Gulch
Helena, Montana 59601

Subject: Review of Revised Baseline Risk Assessment
Montana Pole National Priority List Site
Burlington Northern Railroad
K/J 926008.11

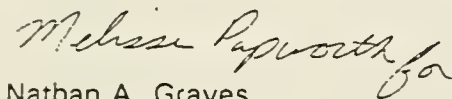
Dear Cathy:

In accordance with our Agreement with Burlington Northern Railroad of 15 March 1993 and Work Order No. 11 dated 19 March 1993, enclosed are comments regarding our review of the Final Baseline Risk Assessment for the Montana Pole National Priority List Site dated 12 August 1992, and the Revised Final Baseline Risk Assessment dated 10 February 1993. These reports were prepared by Camp Dresser & McKee (CDM) for the Montana Department of Health and Environmental Services. The revised report includes responses to comments from the Atlantic Richfield Company.

Please call us at (206) 874-0555 if you have any questions.

Very truly yours,

KENNEDY/JENKS CONSULTANTS



Nathan A. Graves
Vice President

NAG/nmh
7nag2

Enclosure

cc: Mel Burda, Burlington Northern Railroad

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JUL 07 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

REVIEW OF REVISED FINAL BASELINE RISK ASSESSMENT MONTANA POLE NPL SITE

GENERAL COMMENTS

1. We understand and agree that risk management decisions for the entire Butte area must be coordinated. However, it is inappropriate to quantify risk, which will be considered in risk management decisions, using contaminants that are not associated with site activities. At a minimum, the risk assessment should present and discuss risks without consideration of contaminants from offsite sources (i.e., metals).

Risk managers must recognize that cleanup decisions for the Montana Pole site must be considered to reduce the increased risk posed by the site to acceptable levels. Additional cleanup activities at the Montana Pole site that may be required to address area-wide risks due to inorganics must be considered in the decision-making process for area-wide contaminant problems. If necessary, cleanup activities at Montana Pole should be delayed or performed in a manner that will be compatible with area-wide remedial actions.

Similarly, other background risks should be considered in the decision-making process, quantified in the risk assessment, and discussed in the uncertainty analyses. Specifically, background concentrations and risks posed by carcinogenic PAHs and dioxins/furans, which are ubiquitous in the environment, need to be presented in the risk assessment.

2. Considerable disagreement exists about the potential of future residential land use at the site. EPA's risk assessment guidance is not specific. Either a future residential or industrial scenario could be justified. However, it is not reasonable to assume future residential land use, especially future groundwater use as drinking water due to availability of treated surface water from the Butte Water Company. The real question is whether it is reasonably possible for

Butte to stop supplying water. It is not. It would be more cost-effective to assist the Butte Water Company in continuing to supply good quality water to its customers vs cleanup of groundwater that will not be used for drinking water.

Relative to the residential scenario, including future residential development and groundwater use, risk managers must consider the low cost and easy enforceability of assuring future land use as industrial, rather than use costly resources to remediate the site to allow residential development.

3. The accuracy and appropriateness of data used to perform the risk assessment should be reviewed. Our review of the Remedial Investigation Report for the site (comments provided under separate cover) indicate numerous data inconsistencies. Much of the data were not of Contract Laboratory Program (CLP) quality. The level and quality of data validation are uncertain and the use of screening quality data for quantitative risk assessment is questionable. Risk management decisions based on questionable data do not appear appropriate given the potential cost implications of remedy selection.
4. Dermal contact with contaminated soil was considered in the risk assessment and contributes significantly to overall site risk. Yet, EPA's Dermal Exposure Assessment Guidance Document (EPA/600/8-91/011B) does not appear to have been considered in conducting the work. EPA's guidance only provides data on dermal absorption from soil for a few chemicals. In a recent risk assessment in Region 10 (Draft Human Health Risk Assessment, South Tacoma Field site, Tacoma, Washington), EPA did not consider many of the most prevalent chemicals for the dermal absorption pathway since the chemicals discussed in EPA's guidance document were "the only chemicals of concern for which adequate dermal exposure data are available." EPA's guidance does not present data on dermal absorption from soil for many of the contaminants of concern at the site including arsenic, pentachlorophenol, and trichlorophenol.

5. It appears that benzo(ghi)perylene is considered in the evaluation of carcinogenic risks. This compound is a Group D carcinogen, and is specifically not classified as a carcinogen. Therefore, it is inappropriate for consideration as a carcinogen in the risk assessment.
6. There is no reasonable evidence to assume that all chromium is in the +6 oxidation state. This form of chromium is rarely a natural constituent of soil and Cr +6 was not known to be used onsite. Because Cr +6 is not a major contributor to risk, it is unreasonable to include this constituent in the risk assessment.
7. It would be helpful to provide a combined qualitative/quantitative approach to discussing uncertainties in the Risk Characterization (Section 7.0). A table format (see Exhibit 6-21 of Risk Assessment Guidance for Superfund, Volume 1) to evaluate all uncertainties (e.g., exposure, toxicity, data) and likely potential order of magnitude errors in the risk characterization would be valuable to risk managers and the public. Too often, the public can interpret risk estimates as defined values, not wide approximations of reasonable maximum exposure.

SPECIFIC COMMENTS

- Page ES-21, first paragraph. 591 $\mu\text{g}/\text{kg}$ should be changed to 591 $\mu\text{g}/\text{L}$.
- Page 2-4, last paragraph. Historical mining and mineral processing activities in the Butte area have contaminated the Silver Bow Creek drainage basin. Because there is no indication that site-related activities have contributed chemicals such as arsenic, copper, and lead to this area, inclusions of these chemicals in this risk assessment is for the benefit of the State with regard to assessing overall risk. It should be clear that regional background risks not associated with site activities are not appropriate for consideration during a Superfund cleanup. The document does

note that the site is not a source of inorganic chemicals, and the State's response to a similar ARCO comment was that inorganics were included so that risk management decisions can be coordinated as necessary.

- Table 4-1. Anthracene was retained based on maximum distributed concentrations exceeding the risk-based screening criteria. However, Appendix A states a maximum concentration ($2,570 \mu\text{g/kg}$), which does not exceed the risk-based criteria $23,000,000 \mu\text{g/kg}$. The slope factor for benzo(a)anthracene should be changed from $7.7 \times 10^{-2} (\text{mg/kg-day})^{-1}$ to $7.3 \times 10^{-2} (\text{mg/kg-day})^{-1}$.
- Table 4-2. Benzo(b)fluoranthene was retained based on maximum detected concentrations exceeding the risk-based screening criteria. However, Appendix A shows a maximum concentration ($0.098 \mu\text{g/L}$), which does not exceed the risk-based criteria ($0.12 \mu\text{g/L}$).
- Table 4-5. Benzo(b)fluoranthene should not be a chemical of concern for groundwater and anthracene should not be a chemical of concern for soil.
- Page 5-13, Table 5-5. The assumption shown for fraction absorbed is 1.9, which is not explained in the text and is clearly inappropriate. It appears that the intent was to show a fraction absorbed of 1 (a conservative assumption), with footnote "g" indicating that a different absorption assumption was used for arsenic.
- Page 5-30, second paragraph. The upper control limit (UCL) based on a log-normal distribution for pentachlorophenyl (PCP) was considered too high, and an explanation is provided for an alternative approach for determining an exposure point concentration. This approach may not be appropriate given the distribution of PCP in groundwater. Based on the data in Appendix B, it appears that there is a bimodal distribution of PCP, with one peak at approximately 1,000 ppb and another at approximately 1,000,000

ppb. Because information on the location of the monitoring wells is not provided in this report, it was not possible to ascertain the spatial distribution of PCP in groundwater. Regardless, it would be more appropriate to evaluate the data focusing on either or both the lower or higher groupings of PCP concentrations.

Another consideration in evaluating the PCP groundwater data is the nature of the exceptionally high values. The solubility of PCP in water reported in the Merck Index is approximately 80,000 ppb. Concentrations in groundwater above this level may reflect PCP dissolved in oil, bound to suspended particles, or PCP in a separate phase. If PCP is present in a separate phase in groundwater, reported concentrations are greatly dependent on the amount of water, solids, and oil included in the sample for analysis. As such, these concentrations are not meaningful in terms of the dissolved concentration of PCP.

The situation with benzo(a)pyrene (third paragraph) does not appear to be the same as PCP. In this case, there are few detectable concentrations of benzo(a)pyrene in groundwater samples. It does not appear that the data are normally distributed, and a log-normal distribution does not appear unreasonable.

- Page 6-1, last paragraph. The references to section numbers should be to Section 6, not Section 5.
- Page 6-12, third paragraph. It should be noted that the maximum contaminant level (MCL) was derived taking into consideration the potential essential nutrient value of arsenic.
- Page 6-14, second paragraph under 6.3.2. In addition to stating that it is conservative to assume that all chromium is present in the +6 form, it should also be explicitly stated that this form is generally not expected in

the environment. Chromium in the +6 oxidation state is rarely a natural constituent of soil, and chemicals containing Cr +6 are not known to have been present at the site. Also, a release of Cr +6 in areas where hydrocarbons are present would result in the rapid reduction of Cr +6 to Cr +3.

- Page 6-36, first paragraph. It should also be noted that EPA established interim guidance on soil lead cleanup levels at Superfund sites in OSWER Directive 9355.4-02 (dated September 1989). The directive set forth an interim soil cleanup level for total lead of 500 to 1,000 ppm, which the EPA considered protective for direct contact at residential settings. The guidance was developed from a recommendation by the Centers for Disease Control (CDC).
- Page 7-3, Table 7-1. Cadmium is included in this and the following tables, although it was screened out of the data evaluation. See page 4-5 (Table 4-1) and page 4-22. Although the hazard index for cadmium is not significant compared with other chemicals, it is inconsistent to include it at this stage of the analysis.
- Page 7-26, second paragraph. The statement is made that dioxins/furans and phenols do not affect the same organ systems at low doses, and therefore combining hazard indices is not considered appropriate. However, hazard indices for these chemicals are combined in the hazard index tables in this section.
- Page 7-28, fourth paragraph. The potential impact of lead in groundwater on blood levels is stated as significant, and that the proportion of children with concentrations above 10 $\mu\text{g}/\text{dL}$ is greatly increased. Although this is correct as a relative comparison, less than 3 percent of the population is predicted to have blood lead concentrations above 10 $\mu\text{g}/\text{dL}$. As stated on page 7-28, protection of young children is considered achieved when the

model predicts that less than 5 percent of children will have blood levels greater than 10 $\mu\text{g/dL}$.

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6 July 1993

Ms. Cathy Laughner
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Helena, Montana 59601

Subject: Review of Feasibility Study and Proposed Plan
Montana Pole National Priority List Site - Butte, Montana
Burlington Northern Railroad
K/J 926008.11

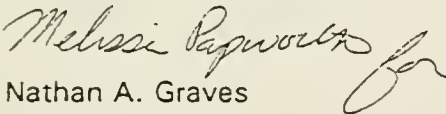
Dear Cathy:

In accordance with our Agreement for Consulting Services with Burlington Northern Railroad dated 15 March 1993 and Work Order No. 11, as amended, enclosed are comments on the Feasibility Study (FS) dated March 1993 and Proposed Plan dated May 1993 for the Montana Pole National Priority List site in Butte, Montana.

Please call us at (206) 874-0555 if you have any questions regarding the information presented.

Very truly yours,

KENNEDY/JENKS CONSULTANTS


Nathan A. Graves
Vice President

NAG/nmh
7nag3

Enclosure

cc: Mel Burda, Burlington Northern Railroad

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Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

REVIEW OF PROPOSED PLAN AND FEASIBILITY STUDY MONTANA POLE NPL SITE

PROPOSED PLAN

Major Comments

1. The Proposed Plan must be revised to reflect comments to the Remedial Investigation (RI) and Baseline Risk Assessment (RA) (provided under separate cover), as well as the Feasibility Study (FS) (contained herein). Once the comments are considered, the Proposed Plan could change significantly, and thus, additional public comment may be warranted.
2. The Proposed Plan describes U.S. Environmental Protection Agency (EPA) and Montana Department of Health and Environmental Sciences (MDHES) evaluation that Alternative 5B is the preferred remedy for the site. Current site risks for soil are within EPA's acceptable risk range of 10^{-4} to 10^{-6} for carcinogenic risks and less than a hazard index of 1 for non-carcinogenic risks.

The only scenario where risks exceed EPA's acceptable levels are a presumed future residential scenario. With existing land use and institutional controls, this scenario would never be realized. Institutional controls could be strengthened to provide better assurances that residential use is not realized. The costs of these assurances would be relatively minor compared to active remediation of the site.

EPA guidance states that EPA must justify remediation activities where risks fall within 10^{-4} to 10^{-6} risk range (OSWER Directive 9355.0-30). The Proposed Plan does not provide any compelling reasons that significant remedial action is necessary at the site. We agree that ongoing light non-aqueous phase liquid (LNAPL) recovery and treatment, as well as treatment of previously excavated

soils, appears appropriate based on the available information. However, additional actions are inappropriate for a potential land use that is not likely to occur. Additional controls may be prudent to assure that residential land use and groundwater use do not occur.

3. Volume estimates and costs presented in the Proposed Plan are similar to those presented in the FS. However, ultimate site cleanup goals are unclear regarding 1) the allowable risk and 2) how cleanup levels were calculated. These two issues must be resolved and appropriate volume estimates revised, if necessary. If cleanup levels are established at 10^{-6} risk, a clear and compelling justification must be provided in accordance with EPA guidance (OSWER Directive 9355.0-30). This justification is especially pertinent because the site is zoned industrial and the only scenario where risks are outside EPA's acceptable range would result from unlikely future use scenario.

Specific Comments

1. Page 2, Paragraph 2. The agencies anticipate that site remediation would be complete in approximately 30 years. No basis for this statement is provided. It appears that the 30-year time frame typically used in FS evaluations was selected. Has any modeling been performed to establish the 30-year remediation assumption? If remediation will require a longer or shorter time frame, practicability assessments and costs of various alternatives may significantly change and could result in another alternative being preferred.
2. Figure 3. The method used to map the extent of contamination needs to be discussed or referenced. The figure shows "hot spots" in the western and southwestern portions of the site where limited data were collected. Are the circular hot spots shown the result of interpolation between borings or is the extent of contamination in these areas an assumption? The actual extent of

contamination in these areas could vary significantly, thereby, affecting evaluations of practicability and costs of various remedial actions.

3. Page 6, Paragraph 6. The statement that the site is residential, and that site and adjacent area groundwater is a drinking water source is misleading. Reportedly, the nearest groundwater supply wells are located across the hydraulic gradient, and it would be nearly impossible to assume contamination of existing wells from groundwater contamination at the site. The RI and FS both indicate that water use restrictions are in effect and that local water is supplied by the Butte Water Company from unrelated sources. It is unreasonable to assume that the Butte Water Company will cease supplying water.
4. Page 6, Paragraph 9. The method used to develop the stated cleanup levels has not been provided and appears to conflict with preliminary remedial action goals (PRAGs) provided in the FS. For example, the FS states that a 3 mg/kg of pentachlorophenol (PCP) represents a 10^{-6} excess cancer risk. If a 1 in 10,000 cancer risk has been selected, as stated in the plan, the cleanup level for PCP would be closer to 300 mg/kg.
5. Page 6, Paragraph 10. It is inappropriate to establish groundwater cleanup levels at proposed Maximum Contaminant Levels (MCLs) or 10^{-6} risk, assuming use as a drinking water source. The FS clearly states that the Safe Drinking Water Act is not "applicable" but is "relevant and appropriate" for the site. If current restrictions exist for groundwater use and a viable supplier of drinking water (Butte Water Company) currently serves the area, it is not reasonable to assume future groundwater use as a drinking water source. EPA's Risk Assessment guidance indicates that if groundwater is not a possible drinking water source, cleanup to protect the groundwater as a drinking water source may not be required. Resources (money) for remedial action implementation would benefit more people by assuring that the Butte Water Company continues to supply good quality water in this area, rather than use the resources to protect a water supply that will not be used.

6. Page 13, Paragraphs 4 through 6. Short-term effectiveness and implementability of Alternative 3 (Capping) are much better compared to Alternatives 4 and 5. This discussion in the Proposed Plan appears to evaluate all of these alternatives similarly. Specifically, there is a significant risk to workers and the nearby public during excavation activities due to physical hazards and dust generation. One construction accident presents a greater risk than current site risks from chemical contamination. Furthermore, release of contaminants during excavation activities is likely, and risks cannot be completely controlled via good housekeeping or dust suppression techniques.

Conducting excavation activities within the water table will be significantly more difficult to implement than capping. In addition, bioremediation and/or soil washing (the primary remediation techniques) have not been proven implementable on this site. While these techniques have been employed on other sites, site-specific considerations and conditions may make these techniques difficult to implement. Without site-specific information, remediation costs may be significantly underestimated, making alternative analysis difficult.

7. Page 13, Paragraph 12. Alternative 5B has been selected by EPA and MDHES as the preferred plan. However, based on concerns presented for the RI, Baseline RA, and FS, meaningful justification for the plan has not been presented. The major components of the remedy, bioremediation and soil washing, have not been tested specifically at the site, making evaluation and cost estimates "best guesses." The basis for cleanup levels and the volume estimates for contaminated media further increase the uncertainties. If the problems and uncertainties associated with the RI and Baseline RA are resolved, and the FS is revised to reflect the results of a revised RI and Baseline RA, a more accurate Proposed Plan can be prepared. A revised FS and Proposed Plan may show that bioremediation and/or soil washing can be practicably implemented if site-specific evaluation of these technologies are preferred.

Based on current information, Alternative 2 (Institutional Controls) or Alternative 3 (Capping) could be considered to satisfy the statutory requirements of CERCLA in accordance with the following arguments:

- Is protective of human health and the environment. Alternatives 2 and 3 eliminate exposure pathways by restricting site and groundwater use. Capping (Alternative 3) provides an added protective measure.
- Complies with ARARS. If MCLs are not ARARs (as they should not be), Alternatives 2 and 3 comply with site ARARs. Previously excavated soils can be treated under these alternatives and surface water standards can be achieved by continued recovery of NAPLs.
- Is cost effective. Both Alternatives 2 and 3 are less costly than the other alternatives yet can minimize exposure pathways.
- Uses permanent solutions to the maximum extent practicable. Alternatives 2 and 3 can use treatment to address oils, sludges, and previously excavated soils. In addition, both alternatives can include continued recovery and treatment of NAPLs, which is considered a permanent solution. Other alternatives are not practicable because they have not been proven effective and the costs are substantial and disproportionate to the potential benefits.
- Satisfies the statutory preference for treatment. As stated above, Alternatives 2 and 3 can provide for treatment of oils, sludges, previously excavated soils, as well as continued recovery and treatment of NAPLs. Treatment technologies provided by the other alternatives have not been proven effective for this site.

FEASIBILITY STUDY

Major Comments

1. The cleanup levels and remedial alternatives presented in the FS do not meet expectations described in the National Contingency Plan (NCP) (40 CFR 300). The NCP expectations include using treatment to address the principal threats posed by a site, whenever practicable, and engineering controls, such as containment, for wastes that pose a relatively low long-term threat or where treatment is impracticable. Principal threats are those where toxicity and mobility of the source material combine to pose a potential risk of 10^{-3} or greater (*Guide to Principal Threat and Low Level Threat Wastes*, Superfund Publication 9380.3-06FS, EPA 1991).

The NCP also states that for known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk of between 10^{-4} and 10^{-6} . Therefore, it is acceptable to develop, evaluate, and select remedial alternatives that do not include treatment if principal threats do not exist.

2. The FS evaluates five remedial alternatives that are based on PRAGs. The PRAGs are based on a 10^{-6} risk level for soil and Safe Drinking Water Act MCLs for groundwater. The soil cleanup levels presented in the Proposed Plan are similar to industrial concentrations for PCP and dioxins, and similar to residential land use concentrations for carcinogenic PAHs. However, the selected remedial alternative, a costly remedy that uses bioremediation to treat soil contamination and pump and treat technology to address groundwater contamination, cannot meet the cleanup levels.

The FS states that bioremediation is expected to achieve a reduction in risk to between 10^{-4} and 10^{-6} for organic contaminants. However, if 10^{-6} is the selected risk level (it is confusing what risk level has been chosen as

"acceptable"), bioremediation may not achieve cleanup levels of 10^{-6} . In that case, the FS states a cap could be required. Therefore, further explanation is required as to: 1) why bioremediation is the selected treatment method if the cleanup levels cannot be achieved, and 2) why capping without significant treatment (as proposed in Alternative 3) is not acceptable if capping is part of the ultimate remedy.

3. The cost estimating methods used in the FS present two potential problems: 1) the use of a 7-percent discount rate, and 2) the inappropriate mark-up of some cost items.

EPA's (1988) document, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, recommends using a discount rate of 5 percent for present worth analysis. The 7-percent discount rate used in the FS underestimates remedial alternative costs. For example, the future cost of Alternative 4C was calculated using a 7-percent discount rate and yielded a present worth value of \$50,474,929 (note that the calculated value in the FS appears incorrect). When a 5-percent discount rate is used, the present worth value is \$55,071,770. This value is approximately 10 percent greater than the 7-percent discount rate value.

Furthermore, EPA's 5-percent discount factor is unrealistic. Research by Arthur Young & Company (*Consulting Engineering*, March 1986) indicates a historical spread between interest and inflation (before taxes) of approximately 2.5 to 3 percent. Therefore, the "net" interest rate seen by corporations will more likely be 2 percent, not 5 percent as suggested in EPA's guidance, or the 7 percent used in the FS. The result is that actual O&M costs will be significantly higher than those presented in the FS.

The second problem in deriving the FS cost estimates involves inappropriate mark-ups on mobilization and demobilization costs in the capital costs section of most cost estimates.

The FS presents cost estimates for some process options that are common to many alternatives. For example, cost estimates are developed for incineration, soil washing, and biotreatment of groundwater (including oil/water separation and carbon polishing). These process cost estimates are then presented as one- or two-line items in the alternatives cost estimates.

The process option costs, which appear in some cases to be inflated, are then marked-up by inappropriate increases in the remedial alternative cost estimates, exaggerating the true cost. For example, the mobilization and demobilization cost for incineration is \$7,597,167, as presented in Table B-4. This cost, which appears to be far above average for incineration start-up and shut-down, likely includes (at a minimum) contractor overhead and profit. However, in Table 5-7, the mobilization and demobilization cost for incineration is increased by 20 percent for contractor overhead and profit, 15 percent for additional mobilization and demobilization, 20 percent for engineering design services, and 15 percent for administrative costs.

It is difficult to understand why incinerator mobilization and demobilization are subject to these additional, but unrelated, mark-ups.

Specific Comments

1. Page E-3, last line. Remedial action objectives for groundwater should not include remediation of site groundwater for use as a drinking water supply if the potential for use is minimal. As stated in the RI and FS, there are current restrictions exist on groundwater use and it is reasonable to assume that a water surveyor (Butte Water Company) will continue to supply water.
2. Page E-5, Paragraph 1. No reasons were provided for the elimination of Alternative 2 as a stand-alone alternative. If properly implemented, this alternative can protect human health and the environment as evidenced by the

fact that if residential and drinking water use are not realized, site risks fall within EPA's acceptable risk range.

3. Page E-5, Paragraph 2. Because they have been implemented by municipal government, institutional controls that are more effective, more enforceable, and unlikely to change. These controls could be strengthened at a relatively minimal cost.
4. Page E-10, Paragraphs 1 and 2. The short-term effectiveness of Alternative 3 is much greater than Alternatives 4 and 5. Similarly, Alternative 3 can be implemented much easier than Alternatives 4 and 5 (see Specific Comment No. 6 on the Proposed Plan).
5. Page 1-12, Paragraph 5. This paragraph addresses the issue of mounding around the southeast and south infiltration galleries. The paragraph references Figure 1-10 as representative of a vertical cross-section through the southeast infiltration gallery. The reference should be to Figure 1-11 (see FS Specific Comment No. 77 regarding Figure 1-11).
6. Page 1-13, Paragraph 3. The direction of groundwater flow in the deeper zone is incorrectly shown in Figure 1-12 (see FS Specific Comment No. 78). This paragraph should indicate that based on Figure 1-12, the groundwater flow is to the north-northeast at a gradient of approximately 0.004 ft/ft.
7. Page 1-13, Paragraph 4. The vertical gradients reported in the RI report (Table 3-4) range from 0.007 to 0.03 ft/ft (not 0.0007 ft).
8. Page 1-14, Paragraph 3. Reference for Bower and Rice (1976) is provided for the data analysis method used for the slug tests. It should be noted that this method is based on a steady-state solution for a confined aquifer. The slug test is transient and the aquifer is unconfined. These differences in the site conditions compared to the analytical solution should be considered.

9. Page 1-15, Paragraph 1. Based on the cited difference in the average hydraulic gradients in the northern and southern halves of the site, the average groundwater velocities have been miscalculated in this paragraph. Specifically, the average groundwater velocity north of the interstate should be reported as 0.42 ft/day (based on $K = 12$ ft/day, $i = 0.007$ ft/ft and $\phi_s = 0.2$). Also the groundwater flow travel time estimate of 10 years should be approximately 11 years [$1,200 \text{ ft} / (110 \text{ ft/year}) = 11 \text{ years}$].
10. Page 2-1, Paragraph 4. This paragraph sites the potential sources of contamination at the site and references the RI report. Statements in this paragraph are neither made nor supported in the RI report. Specifically, this paragraph says, "Potential sources of contamination are spillage around the plant site (especially by the mixing tank)..." In addition, the RI provides information regarding contaminant sources that should be referenced here. Specifically, the LNAPL Recovery and Separated Water Infiltration Systems may have contributed dissolved contaminants to groundwater that may discharge to Silver Bow Creek (page 5-4 of RI).
11. Page 2-2, Paragraph 1. The assumptions used to calculate the volume of surface soils greater than .15 mg/kg are not provided. Specifically, the assumed depth of these soils is not specified. (Also see FS Specific Comment No. 79 regarding the lateral extent of these soils).
12. Page 2-2, Paragraph 2. The RI report refers to five surface water flow pattern samples (SDL101B through SL105B). These samples should be specifically cited. In addition, the range of PCP detected in these five samples should be reported as 8,300 to 54,800 $\mu\text{g/kg}$ (not 8,300 to 26,500 $\mu\text{g/kg}$).
13. Page 2-2, Paragraph 3. According to the Final Data Assessment Tables, kerosene and fuel oil # 2 were not detected in surface soil samples collected from the test pits. In addition, the detected TPH concentrations ranged from 198 to 39,600 mg/kg.

14. Page 2-2, Paragraph 3. This paragraph should state that 15 backhoe test pits were dug, and not, "Analysis of soils sample from 15 backhoe test pits...were used..." In addition, the test pits were primarily centered around the process area of the site. Based on data from this area, the statement in this paragraph that the "lowest concentrations [were] found along the perimeter of the site" is inaccurate.
15. Page 2-3, Paragraph 2. This paragraph erroneously characterizes the results of the surface soil grid samples in the eastern pole storage yard. Specifically, the paragraph associates the results assumed to be from sample E7 as being located "approximately 800 feet east of the former pole plant along the Chicago, Milwaukee, St. Paul, and Pacific Railroad." This sample is not depicted as being located along the Chicago, Milwaukee, St. Paul, and Pacific Railroad in the RI report, Figure 2-10. In addition, this paragraph states that the "highest concentrations are within the former wood treating operations area where PCP concentrations ranged from 163 to 30,700 $\mu\text{g}/\text{kg}$." However, the "former wood treating operations area" is not defined.
16. Page 2-4, Paragraph 1. A "historic drainage ditch" is mentioned, but not defined.
17. Page 2-4, Paragraph 1. According to the Final Data Assessment Tables, the maximum PCP concentration was 1,160,000 $\mu\text{g}/\text{kg}$. This paragraph incorrectly states that the maximum concentration for TPH is 2,304,320 $\mu\text{g}/\text{kg}$ (this concentration is the maxima for PAHs). The maximum TPH concentration is 55,600 mg/kg. This TPH concentration is detected in a sample collected from the northern portion of the site. In addition, the maximum concentrations listed for arsenic, cadmium, copper, lead, and zinc are not consistent with concentrations presented in the Final Data Assessment Tables.
18. Page 2-4, Paragraph 2. According to the data tables, more than 35 subsurface soil samples were collected and analyzed (Table 2-2 is missing from report).

19. Page 2-4, Paragraph 3. Total 2,3,7,8-TCDD equivalent concentrations are reported as ranging from 0 to 16 ppb. The low end of the range (i.e., 0), should probably be reported as being below detection limits.
20. Page 2-4, Paragraph 4. The maximum concentrations listed for arsenic, cadmium, lead, and zinc are inconsistent with concentrations presented in the Final Data Assessment Tables.
21. Page 2-5, Paragraph 2. The borings and test pits considered to be within the former process area of the site are not specified. The concentration provided as the most elevated concentration detected at the surface (based only on the boring and test pit data) appears incorrect. The highest concentration of PCP in the "process area" collected from either test pits or borings was 743,000 $\mu\text{g/kg}$ in test pit SL212C. In addition, the statement that "PCP concentrations were found to be the most elevated at the surface and at the water table" is misleading. No clear pattern or trend is apparent for concentrations between the ground surface and the water table in the process area.
22. Page 2-6, Paragraph 3. The "historical drainage ditch" referred to in the northern area needs to be defined. This paragraph should note that PCP concentrations detected are from those samples not removed from the drainage ditch during the EPA Removal Action. The TPH concentrations detected in six of the borings from the northern area ranged from 71.6 to 55,600 mg/kg. The minimum BTEX concentration is not consistent with the data tables.
23. Page 2-7, Paragraph 2. According to the data tables, the minimum PCP concentration in the bagged soils was 116,000 $\mu\text{g/kg}$ (not 171,000 $\mu\text{g/kg}$).
24. Page 2-7, Paragraph 4. This paragraph provides an estimated areal extent of groundwater contamination, but provides neither a basis for this estimate or a time period for that areal extent.

25. Page 2-9, Paragraph 2. Data do not support the statement that concentrations [in groundwater] decrease in a downgradient direction from the former pole treating area." In fact, the following paragraph refutes this statement by stating that "PCP concentrations in wells in the northwest portion of the site are an order of magnitude higher than the southern area..." In addition, paragraph 2 references a saturation limit of 14,000 $\mu\text{g/L}$ in water for PCP. As commented in the RI review, because the solubility of PCP is extremely dependent on the pH of the water, it is misleading and erroneous to compare the detected concentrations of PCP to this one solubility limit. This paragraph states that "the presence of LNAPL in this well [W-8] may be a result of a possible preferential flow path resulting from the historical drainage ditch..." However, no discussion is presented on the location of this historical drainage ditch and how it would influence the distribution of LNAPL at W-8.
26. Page 2-11, Paragraph 2. Based on the Final Data Assessment Tables, this paragraph should be modified as follows: "TPH concentrations in samples collected from three wells downgradient of this well ranged from less than 0.1 mg/L at a depth of 69.5 feet to 37.1 mg/L.
27. Page 2-11, Paragraph 3. The TPH concentration range for the other groundwater samples collected from the northern area was listed as below the 0.2 mg/L detection limit to 16.7 mg/L. However, TPH was also detected (at a concentration of 639 mg/L) in well W-4, which is also located in the northern area.
28. Page 2-11, Paragraph 4. In the second sentence, the maximum TPH concentration of 3.09 mg/L is not clearly referenced to an associated well location. The concentration 3.09 mg/L was detected in offsite well GW-NE-2. According to the RI, 16 offsite wells were located within the LAO Operating Unit. Is well GW-NE-2 not located within this unit? If this well is located within the LAO Operating Unit, the maximum TPH concentration detected in the LAO groundwater wells should be 3.09 mg/L, not 0.287 mg/L (as stated in the first

sentence of this paragraph). In addition, according to the data tables, concentrations in the additional offsite wells were not below the detection limit. TPH also was detected in offsite well GW-NE-1.

29. Page 2-12, Paragraph 1. The concentration unit for the minimum copper concentration in the shallow groundwater should be mg/L (0.025 mg/L). The maximum copper concentration for offsite groundwater wells is 21.9 mg/L. In addition, it should be noted that metal concentrations discussed in this paragraph are dissolved metals.
30. Page 2-13, Paragraph 1. A maximum LNAPL thickness of 2.19 feet is described. However, Table 3-8 in the RI report presents thicker measurements. It is also stated that LNAPL has never been observed in monitoring wells W-3, W-6, M-6-87, M-7-87, and M-8-87. However, monitoring wells M-6-87 and M-7-87 are not constructed such that LNAPL could be observed. This paragraph includes a discussion of "apparent thickness" vs the actual hydrocarbon thickness within the soil formation. The authors appear to be mixing two different phenomena related to monitoring "floating product" in wells: 1) the "non-static" condition of inflow/outflow of the well, and 2) the thickness of LNAPL in a well is not equivalent to the thickness in the subsurface based on differences in capillary pressures and densities of the fluids. These are two separate conditions and should not be confused.
31. Page 2-13, Paragraph 3. The basis and time period for the estimation of the extent of the LNAPL plume is not stated. The assumption that the actual LNAPL thickness in the aquifer is one-third of the thickness measured in the well is not founded in the physical theory for distribution of the LNAPL in the subsurface (see Farr et al. 1989, *Volume Estimation of Light Non-Aqueous Phase Liquids in Porous Media*).
32. Page 2-15, Paragraph 4. The TPH concentration for fuel oil #4 is 2.17 mg/L.

33. Pages 2-16 and 2-17, Section 2.1.7, Paragraphs 2 through 7. Numerous inconsistencies with the data tables and Table 2-8 appear in these paragraphs. For example, paragraph 2 states that "concentrations of herbicides and SVOCs [semivolatiles] in the TCLP extract were below detection limits." However, according to the Final Data Assessment Tables and Table 2-8, herbicide 2,4-TP and semivolatiles (2,4,6-trichlorophenol and pentachlorophenol) were detected in the TCLP extracts of the separator oil samples. Paragraph 3 states that "concentrations of metals, herbicides, and SVOCs [semivolatiles] in the TCLP extract were all below detection limits." However, according to the data tables, barium was detected in the TCLP extract of a KPEG-treated oil sample at a concentration of 251 $\mu\text{g/L}$. According to Table 2-8, information for herbicides TCLP data (for KPEG-treated oil samples) was not available. However, data for TCLP herbicides for a KPEG-treated oil sample were presented in the Final Data Assessment Tables. The sample concentrations were below detection limits. These same inconsistencies are presented in paragraphs 4 through 7.
34. Page 2-18, Paragraph 1. The summary of PCP concentrations in the northern portion of the site fails to distinguish the difference between soil samples associated with the drainage ditch vs other soils and therefore is misleading.
35. Page 2-18, Paragraph 2. LNAPL has been detected in wells at thicknesses greater than 2.2 feet, as reported in the RI report.
36. Page 2-19, Paragraph 3. Comments were provided for the RI report relative to the estimate of the rates of migration of different contaminants in the subsurface and should be revised accordingly.
37. Page 2-20, Paragraph 2. This paragraph references Section 1.2.2; this section does not exist.

38. Page 2-25, Section 2.3.1. Although the site groundwater is not currently used for drinking water, MDHES has concluded that it is a potential drinking water source. Therefore, MCLs and maximum contaminant level goals (MCLGs) are relevant and appropriate, and proposed MCLs are to be considered. However, the FS reports in Section 4.1.3 that the City of Butte has recently enacted a well ban that prohibits new (i.e., after 31 July 1992) wells for drinking water within the community's central service area, which includes the MPTP site. Because existing institutional controls already prohibit groundwater use, it appears inappropriate to consider MCLs and MCLGs as ARARs for the site.

While Silver Bow Creek is designated as a potential drinking water source, it is unlikely that this water body could supply quality drinking water. Because of the historic mining activities and natural wealth of mineral deposits, it is unrealistic to believe that all other sources of contamination to the creek will be remediated to a level where the creek could be used as a water supply. It should be noted that if the creek is designated as a water supply, groundwater flowing beneath the Montana Pole Site may not be required to achieve drinking water standards until the groundwater discharges to the creek (point of compliance is interface between groundwater and surface water). The current EPA groundwater treatment system at the north end of the MPTP site could continue to operate or be modified to allow compliance with standards at the groundwater/surface water interface.

39. Page 2-34, Paragraph 1. The FS states, "Although the risk from ingesting groundwater is greater than [EPA's] acceptable range, groundwater is not currently used for water supply and the future likelihood of ingesting groundwater is low..." According to EPA's Risk Assessment Guidance, if these conditions are present, drinking water standards are not appropriate for site groundwater.
40. Page 3-3, 3rd Bullet. Site conditions do not warrant remediation of site groundwater for use as a drinking water supply.

41. Page 3-7, 3rd Paragraph and Table 3-1. The PRAGs established for the site, and subsequently used for volume estimates are unclear. The text states that the goals in Table 3-1 present a 1×10^{-6} risk yet the table shows that dioxin/furans and carcinogenic PAHs were calculated at a 1×10^{-4} risk (see General Comment No. 3 and Specific Comment No. 4 on Proposed Plan regarding further confusion of selection of site cleanup levels).
42. Page 3-7, Last Sentence. It should be further stated that EPA must justify why remediation is required beyond attainment of a 10^{-4} risk level (OSWER Directive 9355.0-30).
43. Page 3-8, Paragraph 2. The FS states that if remediated groundwater is recharged into a "clean" portion of the aquifer, contaminant concentrations in the remediated groundwater must not exceed MCLs. However, Table 3-3 presents risk-based PRAGs for groundwater that are more stringent than MCLs. MCLs have been determined to be protective of human health and the environment. Therefore, the risk-based concentrations are inappropriate and should not be presented as a PRAG.
44. Page 3-9, Paragraph 1. The FS states that "... there is little difference between soil volume estimates based on the residential scenario PRAG of 3 mg/kg, the industrial scenario PRAG of 9 mg/kg, and the PCP trespasser land use PRAG (34 mg/kg)." This statement requires explanation. An order of magnitude increase in an action level could result in a significant change in the amount of material requiring remediation. In addition, the methods used to determine volumes of contaminated soil should be explained. Were volumes developed using geographical information system methods?
45. Page 3-9 through 3-11. It is assumed that volume estimates represent cleanup to a 10^{-6} risk level (see FS General Comment No. 2 on confusion regarding calculation of PRAGs).

46. Page 3-11, Paragraph 2. The volume of groundwater requiring remediation is estimated to be 90 million gallons. This value is based on groundwater in place. The FS indicates the actual volume requiring remediation could be significantly more. A more useful value would be a pumping rate and an estimated duration for remediation that could be used to determine remediation costs.
47. Page 4-8, Paragraph 3. Soil flushing is excluded from site-wide consideration due to "potential effects of the soil flushing program...during the design of a groundwater/LNAPL recovery system." However, these same considerations would need to be made for the in situ bioremediation option where oxygen and nutrients were introduced. These considerations are not presented in the following paragraph (Page 4-8, Paragraph 4) concerning in situ bioremediation.
48. Page 4-11, Paragraph 2. The FS notes that the public may oppose onsite incineration. This is understating the case. In addition, obtaining permits and performing test burns for dioxin waste for a new incinerator is likely to be an extremely long and difficult process. Also, the FS notes in Table 4-2 that offsite incineration may be difficult to implement because of the presence of dioxins. If destroying dioxin waste is difficult for a permitted, fixed, and operating incinerator, it is likely to be as or more difficult to implement for an unpermitted, untested, mobile incineration unit. Onsite incineration is not a practical remedial process option. Because of the problems in establishing an onsite incinerator, offsite incineration should not have been eliminated in the technology/process option screening stage and should have been evaluated in a remedial alternative.
49. Page 4-16, Paragraph 3. The FS eliminated solvent extraction because the technology is not effective for oily wastes. According to the EPA's *Superfund Innovative Technology Evaluation Program: Technology Profiles* (EPA 1991), solvent extraction is "potentially effective in treating oily sludges..."

50. Page 4-19, 2nd Full Paragraph. The method for calculating the "average" concentrations is not provided (no discussion is made regarding non-detectable concentrations, nor of the representativeness of the assumed arithmetic average calculated). Also, per previous comments: 1) not all wells are capable of monitoring LNAPL (if it exists) and 2) the maximum thickness of LNAPL observed is greater than 2.2 feet.
51. Page 4-22, Paragraph 3. No reference/basis is provided for the assumed hydraulic conductivity of the aquifer.
52. Page 4-23, Paragraph 1. The flux analysis uses a gradient of 0.004 ft/ft although earlier it cites an average gradient of 0.005 ft/ft for the site. In addition, it assumes that the total thickness of the aquifer discharges to the creek, rather than allowing for any underflow. In fact, based on flow measurements for Silver Bow Creek, significantly less than 35 gpm is contributed to Silver Bow Creek from the MPTP Site.
53. Page 4-24, Paragraph 1. Another reference is made to the release of 35 gpm to Silver Bow Creek "to maintain the water balance across the site." This analysis appears flawed based on flow data from Silver Bow Creek. In addition, no basis/technical analysis is provided for the location or spacing of the three reinjection wells along the south and southeast periphery of the contaminated groundwater plume (see Figure 4-2). Specifically, no consideration or discussion is provided as to how these wells may redirect the plume or hydraulic gradients at the site. This is a critical step in the operation and design of the groundwater control system at the site and should be included in this analysis.
54. Page 4-24, Page 2. No basis is provided for assuming that "at most approximately 3,000 gallons/year of LNAPL would be extracted during the first several years of operation." An estimate of the recoverable LNAPL should be based on a technical analysis of the distribution and recovery of the LNAPL.

55. Page 4-26, Paragraph 2. The FS notes that the presence of metals in groundwater could affect the selection of a discharge location (e.g., Silver Bow Creek) for groundwater treated for organic contaminants. The FS reports that additional treatment for reduction of metals may be necessary. Concentrations of some metals (e.g., arsenic) present in groundwater samples collected during the remedial investigation (summarized in FS Figure 2-15) exceed MCLs. If MCLs are an ARAR for discharging to Silver Bow Creek (see FS Table 2-10), remedial methods for addressing metals in groundwater should have been included in the FS. Exclusion of this analysis could cause groundwater remediation costs to be significantly understated.
56. Page 5-3, Paragraph 3. The FS proposes to evaluate bioremediation to evaluate remediation of the contaminated aquifer. However, the FS reports that the EPA is aware of the difficulty of restoring aquifers to health-based criteria (FS page 3-3). Cleanup criteria for the MPTP site include low levels for many organics (e.g., carcinogenic PAHs). It is unlikely that bioremediation or any other treatment process will achieve these low aquifer cleanup levels. Groundwater remediation to risk-based cleanup levels for an aquifer that is not a current drinking water source is futile and extraordinarily costly. Other groundwater measures besides extraction and aboveground treatment (e.g., plume containment) should have been developed in the remedial alternatives.
57. Page 5-8, Last Paragraph. The FS states that there are no capital costs for Alternative 1. However, institutional controls are presented as a capital cost in Table 5-2.
58. Page 5-29, 1st Full Paragraph. The water treatment system for Alternative 5 includes injecting groundwater treated for organic compounds at locations hydraulically upgradient of the site. Site groundwater has inorganic contaminants that exceed MCLs (e.g., arsenic). The injection process could cause inorganic contaminants to spread to relatively clean portions of the underlying aquifer.

59. Page 5-31, 1st Full Paragraph. The FS states that excavation near Silver Bow Creek could require sheet piling or other engineering controls to minimize releases. However, it is not clear if costs for this requirement are included in the cost estimates. (This comment also applies to Alternatives 3 and 4.)
60. Page 5-33, 2nd Full Paragraph. The FS states that "flowing sand conditions" could be encountered during excavation and that shoring, sheet piling, or well point dewatering could be required. However, it is not clear if costs for these requirements are included in the cost estimates. (This comment also applies to Alternatives 3 and 4.)
61. Page 6-25, 1st Full Paragraph. The FS states Alternative 5B, bioremediation of removed soils, may not significantly reduce the levels of dioxins in the soil. In other words, cleanup levels are likely not to be met for a chemical of concern that EPA and MDHES believe poses risk to human health and the environment. In addition, the low cleanup levels for carcinogenic PAHs (0.236 mg/kg) may be difficult to achieve. Further explanation is warranted as to the selection of a costly cleanup alternative that appears unlikely to achieve the cleanup levels.
62. Page 6-28, 1st Line, Continuation of Previous Page. The FS states, "it may be possible to remediate the aquifer within 30 to 50 years." Alternative 5 is designed to remove most of the LNAPL and restore the groundwater faster than Alternatives 3 or 4 (FS page 6-37). If aquifer restoration is the reason why Alternative 5B is the preferred alternative in the Proposed Plan, further explanation is required to describe why the most costly alternative has been selected if groundwater restoration will require up to 5 decades to accomplish, especially if doubt exists that cleanup levels can be achieved.
63. Page 6-28, Paragraph 1. The FS states that LNAPLs beneath Interstate 15/90 and the EPA groundwater treatment plant are inaccessible. The LNAPL "would be trapped in the soil matrix and would be essentially immobile." If this is true, a low permeability cap for other areas would appear to be an appropriate and

cost-effective method for immobilizing LNAPL compared to excavation and aboveground treatment, especially because cleanup levels cannot be achieved.

64. Table 2-1. It is unclear where the minimum concentrations for PCP and TPH were derived. The minimum concentrations for PCP and TPH ($5 \mu\text{g/kg}$ and 16.5 mg/kg , respectively) were not provided in the Final Data Assessment Tables. Are the minimum concentrations for PCP and TPH represented by one-half the detection limit? If the minimum concentration is represented by one-half the detection limit, it should be stated. (It should be noted that the detection limit of $10 \mu\text{g/kg}$ for PCP and 33 mg/kg for TPH could not be found in the data tables.)

It is unclear as to how the number of samples was tabulated. According to the text and data tables, 5 surface water drainage soil samples, 11 backhoe test pit soil samples, 17 stained and opportunistic soil samples, and 53 surface grid soil samples were collected. Therefore, the total number of soil samples would be 86, not 89. If the additional 4 soil samples that were collected as part of the stained and opportunistic sampling (as discussed in the RI) are included, the total number of soil samples would be 90. If the number of samples is incorrect, the average concentrations should be re-calculated. In addition, it is also uncertain why near surface soil samples were discussed under surface soils, but the data were not included in Table 2-1.

No information is provided in this table to document how the arithmetic mean was calculated. Specifically, no discussion is made regarding samples with no detectable concentration of the contaminant. In addition, frequently an arithmetic mean is an inappropriate measure of "average" conditions.

65. Table 2-2. No footnotes are provided to explain how the average concentration was calculated.

66. Table 2-3. According to the data tables, the minimum concentration for PCP is 116,000 $\mu\text{g/kg}$. It is unclear what the VOC concentrations presented in this table represent. According to the text and data tables, VOCs were not detected in the removed soil. Why were the minimum concentrations for copper and zinc not shown in the table? Why were concentration ranges not shown for arsenic and lead?
67. Table 2-4. How was the arithmetic mean calculated (see FS Specific Comment No. 64 for Table 2-1).
68. Table 2-4. It is unclear where the minimum concentrations for PCP, TPH, arsenic, cadmium, copper, and zinc were derived. It appears that the minimum concentrations for PCP, cadmium, copper, and zinc are represented by one-half the detection limit. If the minimum concentration is represented by one-half the detection limit, it should be stated. The minimum concentrations for TPH and arsenic were not provided in the data tables. In addition, it should be noted that the metal concentrations represent dissolved metals.

It is unclear as to how the number of samples was tabulated. The number of samples listed in the table does not appear to represent the total number of samples presented in the Final Data Assessment Tables. If the number of samples is incorrect, the average concentrations should be re-calculated.

69. Table 2-5. It appears that the minimum concentrations for PCP, TPH, cadmium, chromium, and lead are represented by one-half the detection limit. However, this is not stated. In addition, according to the data tables, 11 surface water samples, including a surface water sample collected from a surface water ponded area onsite, were collected and analyzed for PCP, TPH, PAH, and metals. However, it appears that the sample collected from the surface water ponded area was not included in the concentration ranges for metals. Was it included for calculating the PCP, TPH, and PAH averages? If the number of samples is incorrect, the average concentrations should be re-

calculated. What value was used for non-detects to compute the average concentrations?

70. Table 2-5. How was the arithmetic mean calculated (see FS Specific Comment No. 64 for Table 2-1).

71. Table 2-6. How was the arithmetic mean calculated (see FS Specific Comment No. 64 for Table 2-1).

72. Table 2-6. If the minimum concentrations for PCP and TPH are represented by one-half the detection limit, the minimum concentration for PCP should be 137 $\mu\text{g/kg}$ and the minimum concentration for TPH should be 33.6 mg/kg. The average concentrations should be re-calculated for PCP and TPH. What value was used for non-detects to compute the average concentrations?

73. Table 2-9. This table appeared as Table 4-2 in the RI. Comments regarding this table were included in the review of the RI, which was submitted under a separate cover. This table should be revised to reflect those comments. In addition, several other inconsistencies with the Final Data Assessment Tables appear on this table. It appears several detected concentrations were omitted from the table. Concentrations and concentration units are not consistent with data tables. In addition, the designation "NA" (information not available) listed for some of the sample concentrations should be replaced with "BDL" (below detection limits).

74. Table 3-5. "Volume estimates of contaminated soil" is missing.

75. Table 5-3. Page 1 of 2 is missing.

76. Figure 1-11. Impossible water level measurement for monitoring wells GW20B and GW20A are depicted in Figure 1-11. Specifically, the water levels shown for these wells are below the base of the wells.

77. Figure 1-12. The potentiometric surface in the deep aquifer was contoured based on three data points. These three data points have been incorrectly contoured. Based on the three data points shown in Figure 1-12, the potentiometric surface should be shown as a surface with a gradient of approximately 0.004 ft/ft towards the north-northeast.
78. Figure 2-3. Figure 2-3 depicts PCP and TPH concentrations detected in surface soil samples. Regions shaded on the figure exceed 15,000 $\mu\text{g/kg}$ of PCP and 100 mg/kg of TPH. However, the following regions are shaded on this figure, but are not supported by any soil sampling data: 1) the region to the north, east, and southeast of sampling locations SL215C, SL-8A, and A15; 2) the region to the west of SL205C, SL206C, and A8; 3) the region to the northeast of samples SL006A and E26; and 4) the extent of the soils surrounding W15 and W4 (individually).
79. Figure 2-8. No concentration is provided on figure as boundary of "Estimated Extent of BTEX Contamination."
80. Figure 3-1. Shaded regions do not appear to be consistent with other "surface contamination" figures. (FS Specific Comment No. 79 provided for Figure 2-3 also applies to Figure 3-1.)
81. Figure 4-2. No supporting information is provided for how the injection of water into the three proposed infiltration wells may affect the distribution of contaminants in groundwater. Also, no mention is provided for how the surface drainage will be maintained as shown on this figure.
82. Figure 2-20. "Detected metal concentrations in sediment samples" is missing.

PARCEL, MAURO, HULTIN & SPAANSTRA, P. C.

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July 7, 1993

Mr. Brian Antonioli
Project Officer
State of Montana
Department of Health and
Environmental Sciences
616 Helena Avenue, Room 209
Helena, Montana 59620-0901

VIA FEDERAL EXPRESS

Re: Montana Pole and Treating Plant
Comments Upon May 1993 Proposed Plan

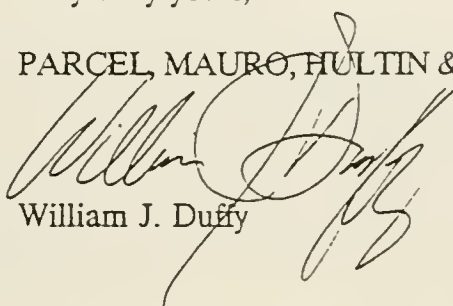
Dear Brian:

On behalf of ARCO, I enclose one copy of the text of ARCO's comments upon the May 1993 Proposed Plan for remedial action at the MPTP site. An original copy with the accompanying attachments will be sent out by federal express to you tonight. At the request of Phyllis Flack, I will forward a floppy disk later this week which includes a computer file of ARCO's comments.

Please contact me with any questions you may have.

Very truly yours,

PARCEL, MAURO, HULTIN & SPAANSTRA, P.C.


William J. Duffy

WJD:lv
Enclosures

cc: Sherry M. Purdy, Esq. (w/encls.) (Via Hand Delivery)
William Kirley, Esq. (w/encls.) (Via Federal Express)

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JUL 08 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

MONTANA POLE AND TREATING PLANT
ARCO COMMENTS UPON THE MAY 1993 PROPOSED PLAN

INTRODUCTION

These comments upon the May 1993 Proposed Plan for the Montana Pole and Treating Plant ("MPTP") site (the "Proposed Plan") are submitted by the Atlantic Richfield Company ("ARCO"). The Proposed Plan sets forth the initial recommendation made by the Montana Department of Health and Environmental Sciences ("DHES") for remedial action at the MPTP site. The DHES initial recommendation corresponds to Alternative 5B described in the Final FS Report.¹ The Proposed Plan provides that the DHES initial recommendation for remedial action was developed with concurrence from the U.S. Environmental Protection Agency ("EPA").

In submission of these comments, ARCO encourages DHES to reconsider its initial recommendation of Alternative 5B as the final remedial action for the MPTP site. General and specific comments upon the Proposed Plan are set forth below. The general comments focus upon issues related to risk assessment and the basis for cleanup levels presented in the Proposed Plan and projected costs for Alternative 5. It is ARCO's position that DHES has improperly applied the risk assessment guidelines and procedures established by EPA in preparing the revised Final Baseline Risk Assessment ("Revised Final BRA") for the MPTP site (CDM 1993), and in determining appropriate cleanup levels for remedial action.

The specific comments which follow the general comments focus upon DHES application of the National Contingency Plan ("NCP") criteria for remedy selection.² Evaluation of the NCP criteria has been carried out in a manner which has biased the remedy selection process. In general, ARCO strongly believes that DHES has failed to

¹ Atlantic Richfield Company (ARCO) Final Feasibility Study, Montana Pole and Treating Plant NPL Site, Butte, MT (April 1993) [the "Final FS Report"].

² See 40 C.F.R. § 300.430(e).

objectively evaluate the effectiveness of Alternative 5 in achieving the cleanup levels for soil and groundwater at the MPTP site.³ One of the principle assumptions made by DHES and EPA which supports the initial recommendation of Alternative 5B in the Proposed Plan is that site remediation will be complete in approximately 30 years or, more generally, that the time frame for site remediation will be significantly shorter for Alternative 5B in comparison with the other alternatives evaluated in the Final FS Report. ARCO's specific comments below include ARCO's technical arguments and supporting calculations that this assumption is unsupported. ARCO requests that DHES give careful consideration to ARCO's comments in selection of the preferred alternative for remedial action at the MPTP site. In preparation of a responsiveness summary of the comments received during the public comment period, ARCO requests that DHES specifically respond to the comments provided below.

GENERAL COMMENTS

The general comments presented below and included as Appendix 1 to this submittal address concerns with the risk assessment process which is the underpinning for remedy selection at the MPTP site. Cleanup levels identified in the Proposed Plan are based upon the protection of human health which are driven by the unreasonable assumption that the MPTP site should support future residential development. Moreover, based upon results of the revised Final BRA for the MPTP site, existing conditions at the site do not present an unacceptable or actionable risk to human health if the more likely future industrial use of the property is assumed for purposes of risk assessment.

³ ARCO has previously submitted comments for the Administrative Record describing its concerns with the Final RI and FS Reports for the MPTP site. These comments were provided to MDHES and EPA in ARCO's Position Paper on Final RI and FS Reports which was submitted April 8, 1993.

1. Future Use of Groundwater for Domestic Water Supply is Unreasonable.

The Proposed Plan notes that site land use has historically been industrial with residential use by the business owner as allowed by zoning. ARCO does not disagree with this characterization.⁴ It does not follow, however, that future land use of the MPTP site will be residential and reasonably include use of groundwater for domestic water supply.

There is currently a well ban in place that prohibits construction of new wells for drinking water within the community's central water service area, which includes the MPTP site.⁵ The current zoning applicable to the MPTP site permits a single residence for a business owner. However, such a residence could not be served by groundwater for domestic water supply. Groundwater use restrictions for the MPTP site are currently in place and enforceable. Thus, DHES has no basis on which to conclude that future use of groundwater for domestic supply is reasonably anticipated and use this assumption in formulating a reasonable maximum exposure scenario for the MPTP site.⁶

The well ban which is currently in place as part of the referenced ordinances will be supplemented through further development of institutional controls. ARCO is working with the Butte-Silver Bow County government to develop a strategic plan for institutional controls. It is anticipated that the framework for institutional controls adopted by the County will include mechanisms for protection of surface and groundwater quality

⁴ Proposed Plan, p. 6. ARCO disagrees with the State's characterization in the Proposed Plan to the extent the State suggests there has been past residential use of the MPTP site. Torger Oaas, a former operator of wood treating operations at the site lives adjacent to but not within the MPTP site as defined by the Administrative Order on Consent, Docket No. SF-90-00001. A copy of the site map is included as an exhibit to the Consent Order.

⁵ See Butte-Silver Bow Ordinance Nos. 427 and 431 that the framework for institutional controls adopted by the County which became effective respectively in May and June of 1992 and established a municipal water utility for the purpose of supplying, treating, transmitting, and distributing water within Butte-Silver Bow County.

⁶ See Appendix 1, pp. 2-4, 6. The Proposed Plan provides: "Generally, the site is bordered on the north by Silver Bow Creek, on the south by Greenwood Avenue, on the west by a former smelter site and on the east by a railroad right-of-way." This description of the site is and of itself suggests the industrial character of the area, and the undesirability of the area for residential development.

and controls to restrict water well development in areas where contamination presently exists. The comments submitted by the County upon the Proposed Plan support and endorse this process.⁷ The NCP provides that an assumption of future residential land use may not be justifiable where the probability of such future use is small.⁸ In light of the current restrictions upon development and the probability that such restrictions will be enhanced with institutional controls with the support of the County, the DHES assumption that residential development is probable for purposes of risk assessment and derivation of cleanup levels is not justified.

2. The Cleanup Levels are Inconsistent with the Final FS Report.

The Proposed Plan identifies cleanup levels for site soils which are inconsistent with the preliminary remedial action goals for organic compounds set forth in the Final FS Report. DHES in the Proposed Plan states that the cleanup levels for soils will be protective to a 1 in 10,000 (1×10^{-4}) cancer risk level for residential and industrial land use at the site.⁹ Specific information describing the derivation of the cleanup levels is not presented in the Proposed Plan. However, it appears that the cleanup levels for soils are inconsistent with and do not correspond to a 1×10^{-4} risk level. Specific comments regarding the procedures followed by DHES in derivation of the cleanup levels identified in the Proposed Plan are presented in Appendix 1.¹⁰

⁷ The comment letter submitted by Butte-Silver Bow County was endorsed by Council of Commissioners at a meeting held June 16, 1993.

⁸ See preamble discussion to Final NCP, 50 C.F.R. § 300.430(d). 55 Fed. Reg. 8666, 8710.

⁹ Proposed Plan, p. 6.

¹⁰ See Appendix 1, p. 3-5.

3. The Procedures and Assumptions Followed in Revised Final BRA Are Flawed.

Appendix 1 to this submittal also addresses issues related to the revised Final BRA which are critical to the risk assessment results.¹¹ The revised Final BRA incorporated some, but not all, comments provided by ARCO in review of the Final BRA document (CDM 1992) which was distributed by DHES. The comments presented in Appendix 1 highlight ARCO's remaining areas of disagreement with the procedures and assumptions adopted in the revised Final BRA. ARCO's decision not to comment upon any specific approach or issue presented in the revised Final BRA should not be interpreted as ARCO's agreement with the approach followed by DHES.

4. The Projected Costs for Soil Washing and Groundwater Treatment are Not Accurate.

Soil washing as a technology option was evaluated in the Final FS Report as a component of Alternatives 3C, 4C and 5C. Soil washing has not been included as part of the initial recommendation for remedial action under the Proposed Plan.

In preparation of the Final FS Report, DHES directed ARCO to calculate costs for soil washing based upon the assumption that only 5% of the soils at the MPTP site are clays and silts (fine-grained materials). Fine-grained materials increase costs for soil washing as a treatment option because the fine-grained fraction must be treated using a different process to meet proposed cleanup levels. Results from the soil washing pilot test performed by EPA at the MPTP site indicates the fine-grained fraction in soils represents approximately 25% of the soil volume. The 25% figure obtained by EPA in the pilot test is consistent with the estimates presented in the Final RI Report for the MPTP site which concluded that 20% of the MPTP site soils are classified as fine-grained.

¹¹ See Appendix 1, p. 5-11.

If an estimate of 20% fines is used for cost estimation purposes, the cost increase for the range of costs estimated for Alternative 5C is \$8.2 million to \$13.6 million. This increase in cost represents the cost associated with treatment of the increased volume of fine-grained residuals.

The initial recommendation of Alternative 5B as the final remedy in the Proposed Plan does include design and construction of a soil flushing system to collect LNAPL from inaccessible soils beneath the interstate highway. The cost estimate for Alternative 5B does not include the cost for design and operation of a soil flushing system. Appendix 3 to this submittal presents ARCO's estimate and tabulation of the component costs to construct and operate a soil flushing system for 30 years. As presented in Appendix 3, the estimated present worth cost for this task under the Proposed Plan is estimated by ARCO to be \$328,000 to \$612,000.

SPECIFIC COMMENTS

To implement the statutory requirements for remedy selection, EPA has adopted nine criteria which are set forth in the NCP for analysis of remedial action alternatives. 40 C.F.R. § 300.430(e). The Proposed Plan provides DHES analysis of the alternatives described in the Final FS Report with the NCP criteria for evaluation. ARCO provides the following specific comments in review of the DHES analysis of seven of the nine criteria as presented in the Proposed Plan. Comments upon State agency acceptance and community acceptance are not provided by ARCO.¹²

¹² For State agency acceptance, the State notes in the Proposed Plan that EPA has agreed with identification of Alternative 5B or 5C as a preferred remedy. ARCO requests that a copy of EPA's written concurrence on the Proposed Plan be included in the Administrative Record.

(1) Overall Protection of Human Health and the Environment.

The State concludes that Alternatives 5A, 5B (the initial recommendation) and 5C would provide the greatest degree of protection of public health and the environment.¹³ The Proposed Plan implies that Alternative 3 (capping) is not as effective as Alternatives 4 and 5 because effective long-term maintenance of the cap would be uncertain and burdensome. As discussed in the ARCO Position Paper and the Final RI and FS Reports, maintenance of a soil cap will not be the only long term O&M activity required on site.

It is ARCO's opinion that long term groundwater collection and treatment will be required as a component of Alternatives 3, 4 or 5. None of the alternatives will remove all sources of contamination. That is, both LNAPL present on the water table and dissolved contamination within the shallow groundwater system would remain following implementation of Alternatives 3, 4 or 5. Because of the behavior of organic contamination in aquifer materials, groundwater collection and treatment will be required for hundreds of years under each of the alternatives to remove residual contamination and control migration off-site migration of contaminants. (See Comments presented in paragraphs (2) and (3) below.) In light of this fact, ARCO believes that Alternatives 3, 4 and 5 are equally as effective in protecting human health and the environment.

(2) Compliance with ARARs.

In support of DHES selection of Alternative 5 as the initial recommendation for remedial action, DHES concludes that chemical-specific ARARs for the groundwater (compliance with MCLs) can be achieved within 30 years and after that time no further actions would be required.¹⁴ This conclusion is inconsistent with the analysis of aquifer

¹³ Proposed Plan, p. 12.

¹⁴ Proposed Plan, p. 2.

recoverability at the MPTP site which is presented in another recent State report.¹⁵ This report, prepared by the State of Montana Natural Resource Damage Program (the "NRDP Report"), states that organic contamination has been adsorbed by the soil materials in the aquifer.¹⁶ Thus, the rate at which the aquifer can recover is dependent upon the time required for pentachlorophenol ("PCP") and other organic contaminants to desorb from soil materials within the aquifer. On this basis, the NRDP Report concludes that the total time required for complete recovery would be hundreds to thousands of years.¹⁷

The conclusion that remediation of the aquifer cannot be accomplished within a 30 year time frame is consistent with the experience the EPA has had with the groundwater extraction systems at other sites. In 1989, the EPA completed a study which assessed the effectiveness of groundwater extraction systems in achieving specified goals.¹⁸ The EPA study, which evaluated 19 sites, concluded that while the concentrations of contaminants in the aquifer decreased significantly after initiation of groundwater extraction, concentration levels of the same contaminants tended to level off at concentrations above MCLs.

The initial recommendation for remedial action is to excavate LNAPL and soils to a depth of 4 feet below the water table. The experience of ARCO contractors with excavation of organic contaminated soils has shown that significantly less than 50% will be removed with the soil if the soil is sandy or gravelly. Recovery of LNAPL can be enhanced by using skimmer pumps to collect LNAPL which accumulates within the excavation.

¹⁵ Montana Pole Treatment (sic) Plant, Groundwater Injury Assessment, Butte, Montana, prepared by John J. Metesh, Montana Bureau of Mines and Geology, April, 1993.

¹⁶ Id., p. 7-3

¹⁷ Id. at p. 7-4. ARCO references the State NRDP Report for the limited purpose of pointing out that the recoverability analysis prepared for purposes of natural resources damages assessment is at odds with the projections of the effectiveness of Alternative 5 as presented in the Proposed Plan. ARCO specifically disputes the conclusions and assumptions set forth in the NRDP Report for the MPTP site.

¹⁸ EPA 1989; Subject: Considerations in Ground Water Remediation at Remediation at Superfund Sites. Subject: Suggested ROD language for Various Ground Water Remediation Options; OSWER Directive Nos. 9283.1-03, 9355.4-03.

However, it is unlikely that more than 70% of the LNAPL can be recovered through excavation of soils and skimming of the water surface in the accessible areas where excavation is contemplated.¹⁹ Moreover, data released by EPA describing work performed by EPA at the MPTP site during Fall 1992 and Spring 1993 shows that 40% of the LNAPL plume is located beneath the interstate highway which bisects the MPTP site and will not be recovered through excavation of the accessible soils under the proposed plan.²⁰ Appendix 4 to the ARCO Comments sets forth ARCO's calculation of volume of LNAPL present in inaccessible soils beneath the Interstate Highway.

This new information was not available prior to submittal of the Final FS Report in February, 1993 and must be considered by DHES in reevaluation of the initial recommendation for remedial action. Assuming for purposes of argument that 100% of the LNAPL can be removed with excavation of accessible soils, the significant volume of LNAPL beneath the interstate highway will provide a continuing source of contaminants to groundwater. Thus, inaccessible soils and organic contamination adsorbed to the soil matrix which will remain following implementation of remedial action under the Proposed Plan will provide a continuing source of contamination which precludes compliance with ARARs within the 30-year time frame assumed by DHES.²¹

¹⁹ The recovery of 70% of organic contamination under the conditions which are at the MPTP site is optimistic based upon experience of contractors employed to carry out removal of the manganese stock piles at the Lower Area One Operable Unit north of Silver Bow Creek. At a recent CTEC meeting, Floyd Bossard reported that 70% of the manganese tailings were recovered below the table. Given the difficulties inherent in excavation of solids such as tailings, excavation of soluble liquids present even more difficult construction conditions which limits effective recovery.

²⁰ See Groundwater Treatment System Report, Montana Post and Pole, Butte, Montana, WA No. 4-640, Status Report prepared for EPA by Roy S. Weston, Inc. and distributed to ARCO under correspondence dated June 21, 1993 to Robert F. Copple, Parcel, Mauro, Hultin & Spaanstra, from Carolyn Doris - Hallett, Assistant Regional Counsel for EPA.

²¹ See Appendix 2 and Appendix 4. The calculations presented in Appendix 2 provide ARCO's estimation of the time required for PCP and other organic contaminants in the product layer to dissolve and be removed from the aquifer (without consideration of adsorption). The calculations in Appendix 4 estimate the volume of LNAPL present in inaccessible soils under the interstate highway.

(3) Long-Term Effectiveness and Permanence.

DHES concludes that the overall effectiveness of groundwater remediation is a function of the volume of the LNAPL excavated under each alternative. This conclusion is based upon the unsubstantiated assumption that the volume of LNAPL which is excavated has a corresponding effect upon the time required for groundwater remediation. DHES acknowledges that groundwater containment and treatment systems proposed as part of Alternatives 3 or 4 could effectively contain contaminated groundwater, limiting contaminant migration, and reducing impacts to Silver Bow Creek to allowable levels.²² However, DHES then goes on to conclude that removal of the greater percentage of LNAPL through excavation under Alternative 5B will ultimately reduce the time required for groundwater remediation and provide the greatest assurance of long-term effectiveness and permanence.²³ As stated above, DHES' conclusion in this regard is premised upon the assumption that the LNAPL layer within accessible soils is the only significant source of contaminants to groundwater. This assumption is inconsistent with the results of the Final FS Report and the State's own analysis of the MPTP site prepared for purposes of natural resource damage assessment.²⁴

Based upon the calculations which are presented and described in Appendix 2 and 4 of this submittal, ARCO believes that the claimed effectiveness of the Proposed Plan in remediating the shallow aquifer at the MPTP site has no technical merit. The ARCO calculations estimate that approximately 45% of the LNAPL (including both the accessible and inaccessible areas) would remain at the MPTP site after 30 years, if

²² Proposed Plan, p. 12.

²³ Id.

²⁴ ARCO references the State NRDP Report for the limited purpose of pointing out that the recoverability analysis prepared for purposes of natural resources damages assessment is at odds with the rosey projections of the effectiveness of Alternative 5 as presented in the Proposed Plan. ARCO's use of the data and assumptions made by the State in the report for purposes of calculations presented in ARCO's comments upon the Proposed Plan is made for purposes of illustration only and without waiver of ARCO's objections to the conclusions and assumptions made by the State in the NRDP Report for the MPTP site. ARCO specifically disputes the conclusions and assumptions set forth in the NRDP Report for the MPTP site.

Alternative 5B is selected and implemented as the final remedy. Given the substantial volume of LNAPL which will remain after 30 years, providing a continuing source of contaminants to groundwater, it is unrealistic to assume remediation of the aquifer will be complete and compliance with MCLs achieved throughout the aquifer at that time. ARCO's estimates take into consideration the new information released by EPA following submittal of the Final FS Report which provides a more accurate picture of the distribution of LNAPL at the MPTP site. Apparently, this information has not been considered by DHES in making its initial recommendation for remedial action. ARCO acknowledges that the estimated 45% figure is at odds with the estimated 87% removal of LNAPL presented in the Final FS Report. However, the 87% removal estimation presented in the FS Report was based upon the incorrect assumption that only 13 to 20 percent of the LNAPL layer was present beneath the interstate highway and inaccessible to excavation. The new information released by EPA since submittal of the Final FS Report demonstrates that this assumption was invalid.

The Proposed Plan acknowledges that groundwater containment strategies implemented under Alternatives 3 or 4 can effectively contain contaminated groundwater at the MPTP site. ARCO's calculations show that the large-scale excavation of LNAPL and contaminated soils proposed by DHES will not reduce the volume of hazardous substances to the point where the time required to remediate the shallow groundwater system to the cleanup levels identified in the Proposed Plan is significantly reduced. Thus, DHES has improperly concluded that Alternative 5 provides the greatest assurance of long-term effectiveness and permanence. Should DHES go forward with its initial recommendation for remedial action, the record of decision must provide a quantitative analysis supporting DHES' apparent assumption that LNAPL in inaccessible soils and desorption of organic DHES' contamination in the shallow groundwater system will not preclude achieving the cleanup levels for PCP and other organic contaminants within the 30 year time frame projected by the Proposed Plan.

(4) Reduction of Toxicity, Mobility, and Volume.

Excavation of soils beneath the water table may have the potential to reduce the volume of hazardous substances present at the MPTP site. This, however, is not the issue. As stated above in the analysis of the preceding NCP criteria, the initial recommendation for remedial action fails to tie excavation of LNAPL and contaminated soils to effectiveness in achieving the remedial action goals established by DHES for the MPTP site. The calculations provided in Appendix 2 and 4 show that the reduction in the volume of hazardous substances achieved through excavation of soils beneath the water table will not significantly reduce the time required to remediate the shallow groundwater system. LNAPL within inaccessible soils and adsorbed in the soil matrix within the shallow groundwater system will remain following remedial action and provide a continuing source of contaminants to groundwater. Thus, the mobility of hazardous substances which remain will not be effectively limited except through use of groundwater containment strategies which are part of Alternatives 3, 4, or 5. As a consequence, no reduction in toxicity within the shallow groundwater system to the cleanup levels will be achieved for hundreds to thousands of years under Alternatives 3, 4 or 5.

(5) Short-term Effectiveness.

The DHES analysis of short-term effectiveness generally concludes that hazards to workers, site visitors and area community members associated with Alternatives 3, 4, or 5 can readily be controlled during implementation of remedial action. Thus, the analysis prepared by DHES perceives no difference between Alternatives 3, 4 or 5 with respect to analysis of this NCP criteria.

Comments regarding the implementation of Alternative 5B, including the short-term risks presented by this alternative, are presented in ARCO's Position Paper. ARCO incorporates those comments by reference into this submittal. Soil capping or partial excavation and capping (Alternatives 3 and 4 respectively), can be accomplished without

substantial risk to on-site workers, site visitors and area community members. The same is not true for Alternative 5. In addition to the risks inherent with worker safety related to stability of soils within deep excavations, the risks posed by volatilization of organic compounds from the surface of exposed groundwater have not been analyzed by the State in the Proposed Plan. The Proposed Plan does not even describe the manner in which excavation would proceed across the site, but does suggest that construction will take 11 years during which short-term risks to human health and the environment will exist. Accordingly, the risks to site workers and area community residents in particular, from hazardous substances exposed by the excavation must be more thoroughly analyzed to support selection of Alternative 5 for the final remedial action.

(6) Implementability.

All of the alternatives analyzed in the Final FS Report are implementable; however, Alternatives 4 and 5 are substantially more difficult to implement than Alternative 3. For example, excavation below the water table (Alternative 5) is more difficult than excavating above the water table. This is because it is difficult for on-site workers to visualize the bottom surface of the excavation. Given the fine-grained texture of the soil materials found on-site, material within the excavation behaves more like a suspension than soil.²⁵

The soil below the water table would require dewatering before treatment. Flowing sand conditions were encountered during excavation of the proposed EPA recovery trench system in Fall 1992. It is reasonable to assume that flowing sand conditions and unstable soils would be encountered north of the interstate highway during implementation of Alternatives 4 and/or 5. Shoring, sheet piling, and/or well point dewatering would likely be required to effectively reduce the geotechnical instability of site soils during construction.

²⁵ This conclusion is consistent with the observations made by Floyd Bossard at the CTEC meeting on June 10, 1993, estimating the recovery of manganese tailings below the water table to be 70% effective.

Dewatering has a potential to spread or redirect the contamination within the shallow aquifer system.

(7) Cost.

In balancing the foregoing factors, Alternative 3B is more cost effective than Alternatives 4B and 5B. A remedy is considered cost-effective if its costs are proportional to its overall effectiveness.²⁶ Cost effectiveness is determined by evaluating three out of the five balancing criteria set forth in the NCP to determine overall effectiveness; 1) long-term effectiveness and permanence; 2) reduction of toxicity, mobility or volume through treatment; and 3) short-term effectiveness.²⁷ While a greater volume of soil may be treated through excavation under the Proposed Plan, LNAPL and heavily contaminated soils will remain on-site, as well as organic contamination adsorbed into the soil matrix below the water table. Thus, excavation and treatment of the additional soil volume under the Proposed Plan will have no demonstrable effect upon the overall effectiveness of the remedy in meeting DHES' objective of remediating groundwater to meet drinking water standards. This is evident from the calculations presented in Attachment 2. Given the significant difference in the range of costs projected for Alternative 5B versus Alternative 3B, both of which can effectively protect human health and the environment, the additional costs for implementation of Alternative 5B under the Proposed Plan is not warranted and may be inconsistent with the evaluation of cost-effectiveness required by the NCP.

²⁶ 40 C.F.R. § 300.430(f)(1)(ii)(D).

²⁷ Id.

APPENDIX 1

ARCO COMMENTS ON RISK ASSESSMENT ISSUES IN MDHES' PROPOSED PLAN AND REVISED FINAL BASELINE RISK ASSESSMENT FOR THE MONTANA POLE AND TREATING PLANT SITE

INTRODUCTION

This appendix presents ARCO's comments on risk assessment issues raised by the *Proposed Plan* for the Montana Pole and Treating Plant (MPTP) site (MDHES 1993) and the revised *Final Baseline Risk Assessment for the Montana Pole NPL Site* (February 1993) (revised final BRA) prepared for the Montana Department of Health and Environmental Sciences (MDHES) by Camp Dresser & McKee (CDM 1993). Comments on the Proposed Plan focus on mischaracterizations of site exposures and risks as well as the inadequate documentation provided for the cleanup levels presented in the Proposed Plan. Comments on the revised final BRA focus on issues that are critical to the risk assessment results, as well as the applications of those results, with which ARCO disagrees with MDHES' chosen risk assessment approach. These areas of comment are discussed in further detail below.

COMMENTS ON THE PROPOSED PLAN

The Proposed Plan raises two major areas of concern for risk assessment issues. First, the discussion of site exposures and risks in the Proposed Plan is misleading with regard to both the types and magnitude of exposures and risks that could reasonably exist at the site. Second, the cleanup levels presented in the Proposed Plan do not correspond with the corresponding preliminary remedial action goals (RAGs) presented in the final Feasibility Study (FS) Report or with the stated target risk level identified in the Proposed Plan.

In describing the potential exposures and risks at the site, the Proposed Plan emphasizes potential risks posed to onsite residents and to individuals consuming affected groundwater. In particular, all of the quantitative risk estimates presented in the Plan are risk estimates derived using a hypothetical future residential scenario. However, the Proposed Plan fails to acknowledge the limited likelihood for future residential development or domestic use of groundwater to occur or the substantially lower risk estimates associated with more realistic exposure scenarios.

Of particular concern is the fact that the quantitative risk estimates presented in the Proposed Plan give the false impression that most risks calculated in the revised final BRA are at the high end or greater than the U.S. Environmental Protection Agency's (EPA) acceptable risk levels (e.g., cancer risk levels of approximately 10^{-3} or higher and hazard indices of 100 or more). In fact, using occupational or trespasser exposure assumptions (i.e., exposure assumptions that are more realistic and more likely to actually occur at the site), all estimated risks calculated in MDHES' risk assessment are within EPA's acceptable range, and human health risks associated with exposures to surface water, sediments, and air are determined by MDHES' risk assessment to be insignificant. The ecological risk assessment similarly concludes that minimal risks are posed by site-related chemicals in Silver Bow Creek. Because (as recognized in MDHES' revised final BRA) the exposure scenario and pathways that could generate the only risk levels exceeding EPA's acceptable risk range are highly unlikely to occur, the risks associated with these hypothetical, unreasonable exposures are similarly unlikely to occur. Risk estimates based on scenarios of such limited likelihood should not be the driving forces in determining the extent of remediation required at this site. The Proposed Plan should be revised to include a summary of risks associated with the occupational and trespasser exposure scenarios and should include a discussion of the relative likelihood of occurrence of the exposure scenarios.

The cleanup levels listed in the Proposed Plan also raise concerns. In the Proposed Plan, MDHES provides soil cleanup levels of 8.2 mg/kg for pentachlorophenol (PCP), 0.000048 mg/kg for dioxins and furans, and 0.236 mg/kg for carcinogenic polycyclic aromatic hydrocarbon (PAH) compounds. However, these values do not correspond with the preliminary RAGs for these substances developed and approved by MDHES for inclusion in the final FS Report (ARCO 1993). MDHES developed the preliminary RAGs for these substances based directly on risk assessment calculations presented in the revised final BRA. MDHES provides no basis for the differences between the values presented in the Proposed Plan and those in the FS Report. Preliminary RAGs for soil presented in the FS Report were risk-based values based on soil ingestion (with the exception of the soil preliminary RAGs for PCP, which were based on dermal absorption).

Moreover, the target risk level presented in the Proposed Plan does not appear to correspond to the proposed cleanup levels in the Proposed Plan. The Proposed Plan states that the cleanup goals provided "would be protective to within a 1 in 10,000 [1×10^{-4}] cancer risk level for residential and industrial land use at the site," indicating that this level is the target risk value for the site with which the cleanup levels should correspond. This target risk level is the upper end of EPA's acceptable risk range (40 CFR Part 300). However, based on comparison with the preliminary RAGs, the cleanup levels presented in the Proposed Plan are more stringent than the stated target risk level and correspond to approximately a 1×10^{-6} cancer risk level (MDHES 1993). Thus, cleanup levels (derived using MDHES risk assessment approaches) that correspond to the target risk level identified in the Proposed Plan would be approximately 2 orders of magnitude greater than those listed in the Proposed Plan (i.e., 820 mg/kg for PCP, 0.0048 mg/kg for dioxins and furans, and 24 mg/kg for carcinogenic PAH compounds) (Table 1).

TABLE 1. COMPARISON OF SOIL CLEANUP LEVELS PROPOSED BY MDHES AND RISK-BASED SOIL CONCENTRATIONS CORRESPONDING TO ARCO PROPOSED EXPOSURE ASSUMPTIONS FOR THE MPTP SITE

Substance	MPTP PRAGs (MDHES) ^a (10 ⁻⁶) ^b	MPTP Cleanup Levels (MDHES) ^c (10 ⁻⁶)	MPTP Cleanup Levels (MDHES) (10 ⁻⁴)	ARCO Risk-based Concentrations (10 ⁻⁴)
Pentachlorophenol	9	8.2	820	12,000
Dioxins/Furans	0.00003	0.000048	0.0048	0.039
PAH Compounds (Carcinogenic)	0.2	0.236	24	800

Note: Cleanup levels in mg/kg. MDHES values based on residential and industrial land use at the site, while ARCO risk-based concentrations are based on occupational land use. MDHES and ARCO values for pentachlorophenol are based on dermal absorption; MDHES and ARCO values for other chemicals are based on soil ingestion.

MDHES - Montana Department of Health and Environmental Sciences

MPTP - Montana Pole and Treating Plant

PAH - polycyclic aromatic hydrocarbon

PRAG - preliminary remedial action goal

^a Source: ARCO (1993).

^b Value in parentheses represents the target cancer risk level to which the column of RAGs corresponds.

^c Source: MDHES (1993).

EPA guidance regarding selection of target risk levels for cleanup goals supports the use of a target risk level of 1×10^{-4} as appropriate for exposure conditions present at the MPTP site. In fact, EPA has noted that risk estimates that exceed 1×10^{-4} may also "be considered acceptable if justified based on site-specific conditions, including any remaining uncertainties on the nature and extent of contamination and associated risks" (U.S. EPA 1991). Because of the limited amount of contact expected with site media (i.e., soil and groundwater) under reasonable assumptions of current and expected future land use, risk-based cleanup goals established using a 1×10^{-4} risk level are adequately protective of human health and are therefore appropriate for application at the MPTP site.

While a 1×10^{-4} target cancer risk level is appropriate for the MPTP site, many of the exposure assumptions and scenarios used by MDHES to derive the risk-based cleanup levels do not reflect reasonably likely site exposures or are not the values best supported by the current scientific literature. Some of the inaccurate assumptions used by MDHES that are most critical to the cleanup level calculations include the assumptions used for soil ingestion rates (for both children and adults), exposed skin surface area, and dermal absorption of chemicals in soil. ARCO has previously presented substantial information supporting alternative values for these assumptions and others that better represent site-specific conditions or are better supported by the current scientific literature (ARCO 1991, 1992b,c). Cleanup levels derived using assumptions that reflect site conditions and the scientific literature would be substantially higher than those set forth by MDHES in the Proposed Plan.

As noted above, MDHES derived the proposed cleanup levels assuming that potential future land use at the MPTP site would be both residential and industrial. However, as repeatedly stated in previous ARCO submittals (1991, 1992b,c), cleanup goals based on residential site use are inappropriate for the MPTP site. Future residential development of the site is highly unlikely given the zoning and other ordinance restrictions that apply to the property and demographic trends in Butte and the surrounding region (i.e., a decreasing population). Instead, future industrial uses of the site are more reasonably likely to occur because such uses are more consistent with current zoning and adjacent land uses. Moreover, use of groundwater as a domestic supply for future development is prohibited by an ordinance adopted by Butte-Silver Bow County.

Table 1 presents risk-based concentrations for an occupational exposure scenario corresponding to a 1×10^{-4} cancer risk level based on exposure assumptions previously proposed and documented by ARCO (1991, 1992b,c), which reasonably represent current and likely future land use conditions. These alternative, better-supported exposure assumptions yield cleanup levels that are more appropriate for application at the MPTP site. As demonstrated in Table 1, cleanup levels derived using these more sound risk assessment assumptions (i.e., 12,000 mg/kg for PCP, 0.039 mg/kg for dioxins and furans, and 800 mg/kg for carcinogenic PAH compounds) are a factor of 8–33 greater than those calculated using MDHES' risk assessment approaches and the target risk level identified by MDHES in the Proposed Plan. MDHES' apparently arbitrary cleanup

levels in the Proposed Plan would substantially bias the remedial decisions toward an unreasonably onerous cleanup for this site.

COMMENTS ON REVISED FINAL BASELINE RISK ASSESSMENT

In February 1993, MDHES issued the *Revised Final Baseline Risk Assessment for the Montana Pole NPL Site* (CDM 1993), which included MDHES' responses to ARCO *Comments on the Final Baseline Risk Assessment for the Montana Pole and Treating Plant Site* (ARCO 1992a). In the revised document, MDHES addressed many of ARCO's comments on the previous version of the BRA by providing direct responses in the cover letter to the revised final BRA and/or by revising or providing additional clarification in the BRA itself. However, other issues raised by ARCO were not addressed by MDHES. Moreover, in response to ARCO comments, while MDHES corrected many of the discrepancies existing between the values presented in the text of the BRA (e.g., exposure parameters or exposure and risk estimates) and the values presented in corresponding tables and provided missing documentation for statements warranting citation and missing references in the document bibliography, a few new discrepancies exist in the revised final BRA.

In addition, there are certain ARCO recommendations that MDHES asserts are incorporated into the revised final BRA; however, the revisions are not apparent in the text of the BRA. For example, MDHES indicates that when characterizing the current potential exposure to chemicals via groundwater for trespassers, the magnitude of that potential was revised from "low" to "none." Furthermore, MDHES states that a discussion of the low likelihood of groundwater use as a residential drinking water supply was added to the uncertainty section. However, neither of these changes are evident in the revised final BRA.

ARCO comments presented below highlight remaining issues presented by the revised final BRA. Issues that most significantly influence the risk assessment results are emphasized. The absence of comment on any specific approach or issue presented in the revised final BRA or in previous ARCO comments does not necessarily indicate ARCO agreement with the approach taken in the revised final BRA.

General Comments

1. **Likelihood of future residential land use and the use of site groundwater as a drinking water supply.** In both the revised final BRA and the Proposed Plan for the MPTP site, MDHES continues to maintain that this scenario and exposure pathway could reasonably be expected at the MPTP site. To support its position, MDHES states that current zoning, floodplain designations, land use, and city groundwater ordinances could change in the future. MDHES also observes that new housing starts have contin-

ued in Silver Bow County even as population has declined. (The specific locations of these housing starts were not provided.) Rather than acknowledge the existing conditions that render future residential development unlikely, MDHES instead assumes that these conditions will change and concludes that future residential development is a realistic assumption.

While a theoretical potential may exist for future residential development of the MPTP site, several factors make such development highly unlikely and weaken the arguments presented by MDHES in support of application of this scenario at the MPTP site. First, present restrictions on the development and use of groundwater at the MPTP site can be enhanced through the use of institutional controls. In particular, Butte-Silver Bow County is presently working on strategic elements of a plan for implementing institutional controls in Butte. The plan will include development permits and groundwater quality controls as mechanisms to supplement engineering controls at Superfund sites such as the MPTP site. Second, although construction of new housing is likely to continue in Silver Bow County regardless of population changes, the influence of this factor on the likelihood of development of the MPTP site is tempered by the extensive availability of more appealing locations within Butte, as well as elsewhere in Silver Bow County, for new residential development. Thus, the likelihood that any such new development would be undertaken at the MPTP site remains low.

2. Finally, the approach taken by MDHES at the MPTP site (i.e., to assume residential development and groundwater use) is inconsistent with the approach used by MDHES at the Idaho Pole site. At the Idaho Pole site, MDHES did not calculate exposures and risks associated with groundwater use for onsite receptors because it assumed onsite receptors would not use groundwater as a domestic water supply (MSE 1992; MDHES 1992b). This assumption was deemed "reasonable" because "the pole plant facility is within the city limits and currently receives city water" (MDHES 1992b), conditions that also exist at the MPTP site and the surrounding area. Similarly, at the Idaho Pole site, the theoretical potential for future changes in site land use (including changes in zoning or other factors) was not deemed adequate to select cleanup goals based on a residential scenario. Instead, MDHES selected an industrial scenario as the most reasonable basis for establishing site cleanup goals based on current and expected future likely land use (MDHES 1992a). Thus, based on technical arguments as well as consistency with MDHES practice at other sites, the theoretical future residential scenario (including groundwater use) should not form the basis for remedial decisions at the MPTP site.
3. Exclusion of inorganic compounds as site chemicals of concern. In the final revised BRA, MDHES agrees with previous ARCO comments that former wood-treating operations at the MPTP site are not a source of inorganic compounds. As ARCO has previously commented, other

activities (such as mining or use of arsenical preparations along onsite railroad spurs) could provide sources of arsenic and other inorganic substances found at the site. However, MDHES continues to include these substances in the MPTP BRA. MDHES states that the MPTP site is unlikely to be specifically addressed as an area of concern for inorganic compounds in other regional risk assessments and the information in the MPTP risk assessment will be necessary to coordinate risk management decisions among regional sites. Because former wood-treating activities at the MPTP site are recognized not to be sources of inorganic compounds such as arsenic at the MPTP site, it is critical that any cleanup requirements for these substances at the MPTP site (including cleanup levels) be consistent with efforts determined to be appropriate at other operable units in the region.

Specific Comments

1. **Page 3-2. Inaccurate description of EPA's site activities beginning in 1985.** In the final revised BRA, MDHES did not address ARCO's comment regarding the accuracy of the description of EPA's previous activities at the MPTP site. As previously discussed by ARCO, the description of EPA activities presented in the previous and revised final BRAs does not reflect the fact that the original groundwater action installed by EPA at the site incompletely intercepted and separated the PCP and oil mixture at the site, and reinjected untreated PCP-containing water into the groundwater, increasing PCP dispersion at the site. Recently, EPA replaced the original, faulty system with a new system that incorporates water treatment prior to discharge to Silver Bow Creek.
2. **Page 5-4, Table 5-1. Identifying current exposures to groundwater as incomplete.** MDHES states in its response to ARCO's comments that Table 5-1 was changed to characterize the listed potential for current exposures to groundwater from "low" to "none." However, Table 5-1 inconsistently indicates that while the pathway is incomplete, the potential for chemical exposure via this exposure medium is low. Moreover, Table 5-1 states that groundwater is not used for drinking purposes but suggests that trespassers may potentially be exposed to groundwater. The pathways by which MDHES believes such exposure might occur are unclear. In particular, the pathways identified in Table 5-1 (i.e., "Ingestion, dermal absorption, and inhalation while showering") are inapplicable to the trespasser exposure scenario. Table 5-1 should be corrected to consistently indicate that groundwater represents an incomplete exposure pathway for all potential receptors and scenarios.
3. **Pages 5-71. Arsenic bioavailability in soil.** The carcinogenic slope factor (CSF) and reference dose (RfD) for ingested arsenic are based on

exposure to arsenic in water. Because the absorption of arsenic in soil is less than that of arsenic in water, risk assessment calculations must account for this difference. The revised final BRA assumes that gastrointestinal absorption of arsenic in site soils is 80 percent compared to the absorption of arsenic in the studies used to derive the CSF and RfD. However, results from a Battelle study using rabbits indicate that the overall relative bioavailability of arsenic in soil is actually 50 percent (Johnson et al. 1991). This value was obtained by comparing absorption of arsenic from soil from Anaconda (28 percent) with absorption of water-soluble arsenic from water (60 percent). Thus, these data indicate that a bioavailability factor of 0.5 should be substituted for the factor of 0.8 used by MDHES.

4. **Pages 5-71 and 6-32. Appropriate animal models for assessing metal bioavailability.** The revised final BRA states that the rabbits and rats used in the Battelle bioavailability studies may not be the most appropriate animal models for such studies. However, substantial information supports the validity of the animal models used in the Battelle studies. In particular, the validity of the Battelle lead bioavailability studies is demonstrated by the recent publication of this work in the peer-reviewed literature. The Battelle arsenic studies will be published in the peer-reviewed literature soon. By contrast, successful use of swine as a model for human bioavailability of lead has yet to be demonstrated in peer-reviewed or other forums.

When evaluating any animal model it is important to be aware that no animal model will perfectly mimic human gastrointestinal physiology (Dressman and Yamada 1991). The purpose of the Battelle bioavailability studies has been to determine the bioavailability of lead or arsenic in soil compared to the bioavailability of soluble forms of these metals. Therefore, an evaluation of the animal model should focus on factors expected to be most critical to such a comparison, including stomach acidity, food transit times, and anatomical structure. For example, EPA has previously raised concerns regarding the impact of coprophagy on bioavailability estimates from rabbits and rats (Weis and LaVelle 1991). Ingestion of feces containing previously unabsorbed arsenic or lead provides another transit through the gastrointestinal tract during which more arsenic or lead could be absorbed, yielding higher bioavailability estimates in rabbits or rats compared to humans. However, the reingestion of excreted arsenic or lead is expected to increase the absorption of soil arsenic or lead relative to the soluble forms of the metals because absorption of the metals from soil is dependent on dissolution in the stomach. The longer the stomach residence time, the more soil arsenic or lead is expected to dissolve and be absorbed.

A similar phenomenon occurs in swine when used to assess the bioavailability of metals from soil. It has been shown that gastric emptying is delayed or incomplete in swine compared to humans (Dressman and

Yamada 1991). Thus, prolonged exposure of soil to low gastric pH in swine may cause increased dissolution and absorption of metals in soil relative to the soluble forms. These factors suggest that estimates of the relative bioavailability of poorly soluble vs. soluble forms of metals obtained from the rabbit, rat, or swine may overestimate the relative bioavailability of soil metals in humans.

5. **Page 6-30. Use of the maximum contaminant level as the reference dose (RfD) for evaluating noncarcinogenic health effects of 2,3,7,8-TCDD.** MDHES has used the maximum contaminant level for drinking water for 2,3,7,8-TCDD to estimate an RfD and corresponding non-carcinogenic health effects associated with this chemical. No RfD value for 2,3,7,8-TCDD has been recommended by EPA in its Integrated Risk Information System. Thus, this approach deviates from standard EPA risk assessment practice.
6. **Page 7-2. Table/text discrepancy.** The text lists the minimum risk associated with soil ingestion in the trespasser scenario as 7×10^{-9} . Table 7-1 lists the correct risk value of 5×10^{-10} .
7. **Page 7-10. Table/text discrepancy.** The text lists the maximum risk associated with exposure to arsenic via soil ingestion in the residential scenario as 3×10^{-3} . However, Table 7-9 lists the correct risk value of 5×10^{-5} . Subsequent discussions of risks via this exposure pathway characterize the arsenic risks correctly (i.e., as being within EPA's acceptable risk range).

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APPENDIX 2

TECHNICAL MEMORANDUM MONTANA POLE AND TREATING PLANT SITE AQUIFER REMEDIATION CALCULATIONS

SUMMARY

The Montana Department of Health and Environmental Sciences (DHES) stated in the Proposed Plan for the Montana Pole and Treating Plant (MPTP) site that the aquifer beneath the site would be cleaned-up in 30 years under Alternative 5. It is assumed that the time required for cleanup was based on data presented in the Clark Fork Natural Resource Damage Assessment - Groundwater report (NRD report) (MBMG, 1993). If that is the case, then DHES misinterpreted the data presented in that report. The NRD report states that it would take between 18 and 669 years to deplete the PCP from the product plume. Thirty years was based on assumed conditions near the center of the plume. A large range in the predicted time required to deplete the pentachlorophenol (PCP) is presented in the NRD report because of the uncertainty in determining the mass transfer rate of PCP from the product into the groundwater.

The data presented in the NRD report were apparently based on measured mass transfer rates and do not take into account transport of the dissolved PCP. As a result, neither the low-end nor high-end numbers are considered representative of what might actually happen at the site. In addition, the time required to cleanup the aquifer should be based on not only the time required to deplete the PCP, but also the time required to deplete the remaining product in the light, nonaqueous-phase liquid (LNAPL) layer. The product, which is assumed to behave like diesel, would dissolve much slower than PCP and would therefore, take significantly longer to deplete. Based on the solubility's of diesel and PCP alone, it is estimated that dissolution of the entire product plume will take at least 25 times longer than the shortest time required for PCP dissolution ($18 * 25 = 450$ years). However, when you consider the relative mass of diesel to PCP in the product, it could take about 700 times longer to dissolve the diesel compared to the PCP.

This technical memorandum is intended to provide an estimation of years required to remediate the aquifer (referred to as "cleanup") at the MPTP site based on site-specific data. Two scenarios were evaluated: (1) remediation of the aquifer assuming no excavation of soil and LNAPL (Alternative 3), and (2) remediation of the aquifer assuming excavation of soil in accessible areas (Alternative 5). Under Alternatives 3 and 5, the time required to cleanup the aquifer beneath the MPTP site would include the time required to deplete the product plume, plus the time required to deplete the product adsorbed to the soil. The calculations performed as part of this memorandum only consider the time required to deplete the product plume source. For purposes of illustration only, the calculations and results presented in this Attachment 2 follow the analytical approach and assumptions

commenting upon the Proposed Plan is without waiver of ARCO's arguments regarding the validity, accuracy or appropriateness of the approach and assumptions adopted by the State in the NRD report.

The calculations performed for this memorandum show that, under Alternative 3, the shortest time (lower limit of remediation time range) expected for complete PCP dissolution is approximately 60 years assuming an extraction rate of 100 gallons per minute (gpm) sustained over the entire remediation period. The upper limit of the remediation time projected is of the order of hundreds of years, reflecting the uncertainty in determining the parameters relevant to the transport of dissolved PCP. These calculations account for the dissolution of PCP only. Complete dissolution and flushing of contaminants from the product plume will take longer because diesel is much less water-soluble than PCP and the percentage of diesel in the product is greater than the percentage of PCP. The time required for remediation of the aquifer, i.e., the estimated time required for dissolution of the entire product plume and flushing of contaminants from the aquifer through groundwater extraction, is estimated to be 25 to 700 times the shortest time required for PCP dissolution. These projected remediation time frames are consistent with time frames of hundreds of years reported in the literature when nonaqueous phase liquids (NAPLs) are present (Cherry and Feenstra, 1990; Johnson and Pankow, 1992). The longer estimates are more realistic because the longer time frames are necessary to all desorption of contaminants from the soil matrix.

Under Alternative 5, where it is assumed that the product plume has been removed by excavation with the exception of the area underneath the Interstate, the shortest time estimated for PCP dissolution from a product plume extending only underneath the Interstate is approximately 77 years at an extraction rate of 25 gpm. The upper limit is again of the order of hundreds of years. As stated above, these calculations account for the dissolution of PCP from the LNAPL layer only. The time required for dissolution of the entire product plume is estimated to be 25 to 700 times the shortest time required for PCP dissolution. The time required for flushing of contaminants from the aquifer is dependent upon the rate at which contaminants desorb from the soil matrix. The rate of desorption is not evaluated in this memorandum.

APPROACH

In order to estimate the time frame required for dissolution and removal of the PCP, an approach was followed that makes use of an analytical solution and parameters derived by reference to the NRD report. This approach uses data obtained for PCP dissolution under static groundwater conditions from the NRD report, and expands on this information by considering transport of the dissolved PCP. The approach followed consists of three main steps/assumptions: (1) determine the strength of the PCP source by approximating the floating product as a NAPL lens that acts as a source of PCP; the strength of the PCP source is equal to the PCP concentration at the product-groundwater interface, (2) determine average PCP concentration in groundwater flowing past the NAPL lens, as a

function of the aquifer thickness, the extent of the NAPL lens, the groundwater velocity, and the coefficient of dispersion, and (3) determine pore volumes to be extracted for removal of the dissolved PCP and time required based on the assumed extraction rate.

The first part of this memorandum, (I), discusses the results of the calculations performed to determine the time required to dissolve the PCP in the LNAPL layer for both Alternatives 3 and 5. These calculations are based on the simplifying assumption that the PCP concentration at the product-water interface remains constant throughout the dissolution process. This approach was followed in the NRD report and was used in this technical memorandum to compare results for different scenarios and values of coefficient of dispersion. However, it should be stressed that this is a solution based on the simplifying assumption that the PCP concentration at the NAPL-water interface is constant, an assumption that results in underestimation of the total time required. In the second part, (II), the effects of the decreasing PCP concentrations at the interface are incorporated in the calculations to obtain a more realistic estimate of the lower limit of the remediation time frame. In the third part, (III), the estimated time frame for the PCP dissolution is compared to the projected time frame for the dissolution of the remaining product lens into groundwater for extraction from the aquifer by means of a pump and treat system.

(I) Calculation of Cleanup Time for Alternatives 3 and 5 Assuming PCP Concentration at the Product-water Interface Remains Constant.

The analytical solution employed assumes horizontal flow of groundwater past a source area of constant strength, equal to the concentration of the PCP at the product-groundwater interface. The average concentration of PCP within the aquifer is given as a fraction of the PCP concentration at the source (PCP concentration of 140 mg/l [MBMG, 1993]), by Equation 1 in Attachment. The distribution of dissolved PCP is a function of the coefficient of dispersion which incorporates the diffusion characteristics of PCP and the dispersion characteristics of the aquifer. Selection of representative coefficient of dispersion is a controversial topic in the literature (Freeze and Cherry, 1979); as a result, a wide range was assumed for this parameter. Based on the above assumptions, the average PCP concentration in the aquifer was calculated to range from 2.8 to 77 mg/l; the corresponding range of PCP mass in one pore volume ranges from 560 to 15,400 kg, for low and high coefficient of dispersion values, respectively.

Alternative 3

The associated pore volumes, for a total mass of PCP of 498,960 kg (MBMG, 1993), range from 32 to 891. Assuming an extraction rate of 100 gpm, the time required for removal of the PCP would range from 32 to 896 years.

Alternative 5

For the area underneath the interstate, the time frame for PCP removal ranges from 41 to 1400-years, assuming an extraction rate of 25 gpm.

Retardation effects due to sorption of organic contaminants in the soil matrix are not incorporated in these calculations. Sorption will further increase the time required for remediation of the aquifer to meet the clean-up levels specified in the Proposed Plan. It should be also noted that the dissolution model employed assumes that the concentration of the PCP at the product-water interface remains constant. In reality, the concentration of the PCP at the interface decreases while the percentage of the PCP in the diesel mixture declines, because PCP dissolves much faster than diesel. The effects of decreasing PCP concentration at the interface are discussed below.

(II) Calculation of Cleanup Time for Alternatives 3 and 5 Assuming PCP Concentration at the Product-water Interface Decreases with Time.

The PCP concentration at the product-water interface is directly related to the mole fraction of PCP in the product-PCP mixture (see Equation 2 in Attachment). The mole fraction of the PCP in the mixture can be calculated from the percent PCP content of the product. For the calculations it was assumed that diesel dissolves five times slower than PCP. This is a conservative assumption based on a comparison of the concentrations of dissolved PCP (140 mg/l) and diesel [expected to be close to its aqueous solubility of 5 mg/l (BEIA, 1989)] at the water-NAPL interface. The PCP mole fractions can be calculated in stages as the NAPL lens becomes depleted of PCP faster than diesel. By calculating PCP mole fraction decreases in four time steps, a total number of 60 pore volumes is calculated for Alternative 3. This corresponds to an almost 100 percent increase over the 32 pore volumes calculated without taking into account the continuous depletion of the PCP that results in lower concentration gradients. The time required for extraction of 60 pore volumes from the area covered by the NAPL plume is approximately 60 years at an extraction rate of 100 gpm. For Alternative 5, 123 pore volumes are required to deplete the PCP under the Interstate. At an extraction rate of 25 gpm, it would take approximately 77 years to extract 123 pore volumes of water. The time frames discussed above are considered the shortest time expected for complete PCP dissolution. These time frames do not include product dissolution or consider desorption of product from the soil matrix.

(III) Projected Time Frame for Dissolution of the Product Lens.

As mentioned above, diesel dissolves much slower than PCP. As a result, even after all the PCP has been transferred from the NAPL lens into the groundwater, there will still be free product in the aquifer. By using again Equation 1 and assuming a constant concentration of diesel at the water-diesel interface of 5 mg/l (equal to the aqueous solubility) and high coefficient of dispersion, it follows that a total of 22,800 pore volumes of groundwater need to be removed for complete diesel dissolution. This volume of water is equal to 700 times the volume calculated in (I) or about 380 times the volume calculated in (II).

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BY UTP DATE 6/28/93 CLIENT ARECO SHEET 1 OF 8
 CHKD. BY EFM DESCRIPTION _____ JOB NO. 3052.0054

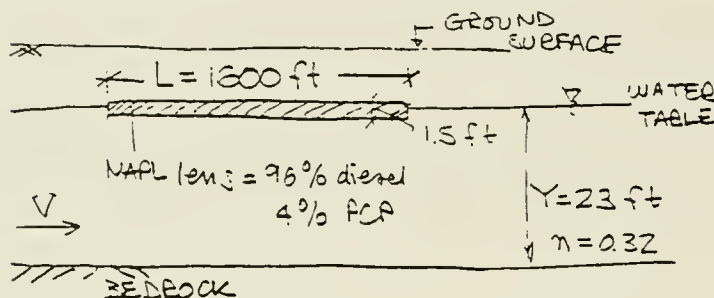
Statement of the problem

- Estimate ► dissolution rate of pentachlorophenol (PCP) from diesel floating on top of the water table to groundwater
 ► pore volumes to be extracted for complete PCP removal

Approach

- Establish cross sectional area

Plume dimensions:



$$\text{Area} = 1600 \times 600 = 960,000 \text{ ft}^2$$

$$\text{Thickness} = 1.5 \text{ ft}$$

(MBWG report, page 7-3)

- Calculate the average concentration $\bar{C}(L, Y)$ leaving the NAPL lens, assuming parallel flow of pore fluid with velocity V , over the length of the lens, L , and the thickness of flow domain, Y , as (Sitar et al., 1990)

$$\frac{\bar{C}(L, Y)}{C_s} = \frac{1 - e^{-w^2}}{w \sqrt{\pi}} + \text{erfc}(w) \quad (1)$$

where: C_s is the PCP concentration at the NAPL-water interface

$$w = \frac{Y}{2 \sqrt{\frac{D}{V} \times L}}$$

D is the coefficient of dispersion

$$D = D^* + \alpha_t V \quad D^* = \text{effective diffusion coefficient}$$

$$\alpha_t = \text{transverse dispersivity}$$

- Determine solution parameters

$$L = 1600 \text{ ft}$$

$$Y = 23 \text{ ft} \quad (\text{MBWG report, page 6-3})$$

$$V = 0.3 \text{ ft/day} \quad (\text{MBWG report, page 4-4})$$

$$C_s = 140 \text{ mg/L} \quad (\text{MBWG report, Appendix III, page 50})$$



BY UTP DATE 6/28/93 CLIENT _____ SHEET 2 OF 8
 CHKD. BY EPM DESCRIPTION _____ JOB NO. _____

$$D^* = 10^{-3} - 10^{-6} \text{ ft}^2/\text{day}$$

$$\alpha_L = 10^{-1} - 10^{-4} \text{ ft}$$

A wide range is used for these parameters in the absence of PCP-specific and aquifer-specific data and given the wide variability acknowledged in the relevant literature (Freeze and Cherry, 1979; Citor et al., 1990)

$\Downarrow$
 D varies between 3×10^{-5} and 3×10^{-2}

$\Downarrow$
 $\frac{D}{V}$ varies between 1×10^{-4} and 1×10^{-1}

► Calculation for high end of coefficient of dispersion range $D = 3 \times 10^{-2}$
 $\left(\frac{D}{V} = 10^{-1}\right)$

$$W = \frac{23}{2\sqrt{0.1 \times 1600}} = 0.91$$

$$\textcircled{1} \rightarrow \frac{C}{C_s} = \frac{1 - e^{-0.91^2}}{0.91\sqrt{\pi}} + \text{erfc } 0.91 = \frac{1 - 0.437}{0.91\sqrt{\pi}} + 0.203 \Rightarrow \boxed{\frac{C}{C_s} = 0.55} \textcircled{A}$$

► Calculation for low end of coefficient of dispersion range $D = 3 \times 10^{-5}$
 $\left(\frac{D}{V} = 10^{-4}\right)$

$$W = \frac{23}{2\sqrt{0.0001 \times 1600}} = 28.9$$

$$\textcircled{1} \rightarrow \frac{C}{C_s} = \frac{1 - e^{-28.9^2}}{28.9\sqrt{\pi}} + \text{erfc } 28.9 = \frac{1 - 0}{28.9\sqrt{\pi}} + 0.000 \dots = \boxed{\frac{C}{C_s} = 0.002} \textcircled{B}$$

► Calculate pore volumes needed to be extracted to remove the total PCP mass.

$$\text{Total mass of PCP in diesel lens} = 1.1 \times 10^6 \text{ lb (UBNG, page 7-3)} \\ = 498,960 \text{ kg}$$

$$\begin{aligned} \text{Volume of water in one pore volume} &= \text{aquifer thickness} \times \text{lens area} \times \text{porosity} \\ &= 23 \text{ ft} \times 960,000 \text{ ft}^2 \times 0.32 \text{ (UBNG, page 2)} \\ &= 7,065,600 \text{ ft}^3 \\ &= 200,075 \text{ m}^3 \\ &= 52,860,000 \text{ gallons} \end{aligned}$$



BY UTP DATE 5/28/93 CLIENT _____ SHEET 3 OF 8
 CHKD. BY EPM DESCRIPTION _____ JOB NO. _____

Mass of PCP in one pore volume = volume $\times$ average PCP concentration *

$$\textcircled{A} = 200,075 \text{ m}^3 \times 77 \times 10^{-3} \frac{\text{kg}}{\text{m}^3} = 15,406 \text{ kg}$$

$$\textcircled{B} = 200,075 \text{ m}^3 \times 2.8 \times 10^{-3} \frac{\text{kg}}{\text{m}^3} = 560 \text{ kg}$$

* Case $\textcircled{A}$ PCP concentration = $140 \frac{\text{mg}}{\text{L}} \times 0.55 = 77 \frac{\text{mg}}{\text{L}} = 77 \times 10^{-3} \frac{\text{kg}}{\text{m}^3}$

$\textcircled{B}$ $140 \frac{\text{mg}}{\text{L}} \times 0.02 = 2.8 \frac{\text{mg}}{\text{L}} = 2.8 \times 10^{-3} \frac{\text{kg}}{\text{m}^3}$

Pore volumes to remove all PCP = $\frac{\text{Total PCP mass}}{\text{PCP in one pore volume}}$

$$\textcircled{A} \frac{498,960 \text{ kg}}{15,406 \text{ kg}} = \boxed{32 \text{ pore volumes}}$$

$$\textcircled{B} \frac{498,960 \text{ kg}}{560 \text{ kg}} = \boxed{891 \text{ pore volumes}}$$

► Calculate time frame for pore volume extraction

$$\text{Time} = \frac{\text{Extracted groundwater volume}}{\text{Extraction rate}}$$

Assume extraction rate of 100 gpm

$$\textcircled{A} \frac{52,860,000 \text{ gal} \times 32}{100 \text{ gal/min}} = \boxed{32 \text{ years}}$$

$$\textcircled{B} \frac{52,860,000 \times 891}{100 \text{ gal/min}} = \boxed{896 \text{ years}}$$



BY UTP DATE 6/22/93 CLIENT _____ SHEET 4 OF 8
 CHKD. BY EPM DESCRIPTION _____ JOB NO. _____

Notes: ① The calculations of the pore volumes needed to be extracted do not take into account retardation due to adsorption, i.e. it is assumed that the hydrodynamic front and the solute front coincide. With a retardation factor of 12, as determined for the Montana Pole site in the UBUG report, the solute front will migrate at a velocity of $1/12$ the velocity of the hydrodynamic front. As a result, the total time required for PCP removal will be much greater than the estimate above.

② The dissolution model used assumes constant PCP concentration at the diesel-water interface. However, the PCP concentration is a function of the aqueous PCP solubility and the mole fraction of the PCP in the diesel. As a result, as the diesel is depleted from PCP the mole fraction of the PCP decreases and the interface concentration is decreasing accordingly (diesel dissolves but slower than PCP)

► Incorporate effects of decreasing interface PCP concentration in the solution

► Calculate initial mole fraction of PCP for a mixture consisting of 96% diesel & 4% PCP (UBUG, page 7-3)

U.W of PCP = 266.35 (Merck Index)
 average U.W of diesel = 227 [Biomedical and Environmental Information Analysis (BEIA), IRP Toxicology Guide, Vol. 4]

Example of mole fraction calculation:

$$\begin{array}{l} 1000 \text{ gr diesel} < \begin{array}{l} 960 \text{ gr diesel} \rightarrow \frac{960}{227} = 4.23 \text{ moles diesel} \\ 40 \text{ gr PCP} \rightarrow \frac{40}{266.35} = 0.15 \text{ moles of PCP} \end{array} \\ \text{mixture} \end{array}$$

Initial mole fraction of PCP $X_{PCP} = \frac{0.15}{4.23 + 0.15} = 0.034$

The concentration of PCP at the interface, C_{PCP_i} , is given as (Sitar et al., 1990):

$$C_{PCP_i} = C_{PCP_w} \cdot X_{PCP} \cdot \gamma_{PCP} \quad (2)$$



BY UTP DATE 3/28/93 CLIENT _____ SHEET 5 OF 2
 CHKD. BY EPH DESCRIPTION _____ JOB NO. _____

where C_{PCP-w} is the aqueous PCP solubility

X_{PCP} is the PCP mole fraction

γ is the activity coefficient.

From (2) it follows that C_{PCP} decreases linearly with X_{PCP} .

► Repeat dissolution calculations in four stages for case (A).

► Assume that for the removal of the first $1/4$ of the PCP mass the PCP mole fraction remains constant at 0.034.

For the first $1/4$ $(32/1) = 3$ pore volumes need to be extracted
 (124,740 kg)

► Assume that when $1/4$ of the PCP is dissolved, $1/20$ of the diesel is also dissolved (diesel has an aqueous solubility of 5 mg/L, i.e., is much less soluble than PCP so the assumption that diesel dissolves 5 times slower than PCP is conservative). The new mole fraction for PCP is 0.027.

$$\text{New interface concentration for PCP} = 140 \times \frac{0.027}{0.034} = 111 \text{ mg/L}$$

$$\text{PCP mass in one pore volume} = 15,406 \times \frac{111}{140} = 12,214 \text{ kg}$$

$$\text{For the second } 1/4 \quad \frac{124,740 \text{ kg}}{12,214 \text{ kg}} = 10 \text{ pore volumes}$$

► When $1/2$ of the PCP is dissolved, assume $1/10$ of the diesel is dissolved. New mole fraction for PCP is 0.019

$$\text{PCP mass in one pore volume} = 15,406 \times \frac{0.019}{0.034} = 8,610 \text{ kg}$$

$$\text{For the third } 1/4 \quad \frac{124,740 \text{ kg}}{8,610 \text{ kg}} = 14.5 \text{ pore volumes}$$

► When $3/4$ of the PCP is dissolved, assume $3/20$ of the diesel is dissolved. New mole fraction for PCP is 0.01



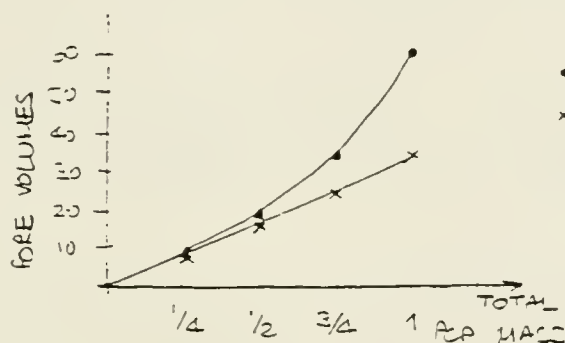
BY UTP DATE 5/28/93 CLIENT _____ SHEET 6 OF 8
 CHKD. BY EFM DESCRIPTION _____ JOB NO. _____

$$\text{PCP in one pore volume} = 12,406 \times \frac{0.01}{0.034} = 4,530 \text{ kg}$$

$$\text{For the last } 1/4 \quad \frac{124,740 \text{ kg}}{4,530 \text{ kg}} = 27.5 \text{ pore volumes}$$

⇒ Total number of extracted pore volumes for PCP removal when taking decreasing PCP interfacial concentration into account:

$$(8 + 10 + 14.5 + 27.5) = 60 \text{ pore volumes}$$



• decreasing mole fraction
 x constant mole fraction

Corresponding time frame

$$= 60 \text{ years}$$

Pore volumes required for diesel dissolution

Case (A) assume $C_s = 5 \text{ mg/L}$ (aqueous solubility, BEIA (1989))

Mass of diesel in one pore volume

$$200,075 \text{ m}^3 \times 5 \times 10^{-3} \frac{\text{kg}}{\text{m}^3} \times 0.55 = 550 \text{ kg}$$

$$\begin{aligned} \text{Total volume of diesel} &= 1.5 \text{ ft} \times 960,000 \text{ ft}^2 \times 0.32 \\ &= 460,800 \text{ ft}^3 \\ &= 13,050 \text{ m}^3 \end{aligned}$$

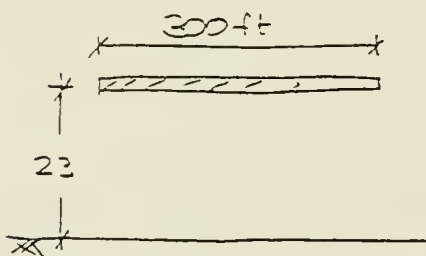
$$\text{Total mass of diesel} = 13,050 \text{ m}^3 \times 0.96 \times 10^3 \frac{\text{kg}}{\text{m}^3} = 12,528,000 \text{ kg}$$

$$\begin{aligned} \text{Pore volumes} \\ \text{for diesel dissolution} &= \frac{12,528,000 \text{ kg}}{550 \text{ kg}} = 22,800 \end{aligned}$$



BY UTP DATE 6/22/93 CLIENT _____ SHEET 7 OF 8
 CHKD. BY EPH DESCRIPTION _____ JOB NO. _____

► Repeat (I) for the area underneath the interstate



Plume dimensions:

$$\text{Area } 300 \times 500 = 150,000 \text{ ft}^2$$

Note: Assume that the plume area under the interstate is equal to 0.15 times the total diesel plume area

$$W = \frac{23}{2\sqrt{0.1 \times 300}} = 2.1$$

$$\textcircled{1} \rightarrow \frac{C}{C_s} = \frac{1 - e^{-2.1^2}}{2.1 \sqrt{\pi}} + \text{erfc } 2.1 = 0.265 - 0.003 \Rightarrow \boxed{\frac{C}{C_s} = 0.27} \textcircled{A}$$

$$W = \frac{23}{2\sqrt{0.0001 \times 300}} = 66$$

$$\textcircled{1} \rightarrow \frac{C}{C_s} = \frac{1 - e^{-66^2}}{66 \sqrt{\pi}} + \text{erfc } 66 = 0.008 - 0.0000... \Rightarrow \boxed{\frac{C}{C_s} = 0.008} \textcircled{B}$$

► Total mass of PCP underneath the interstate

$$\text{Total PCP mass} \times \frac{\text{Area under the interstate}}{\text{Total area}} = 498,960 \text{ kg} \times \frac{150,000 \text{ ft}^2}{969,000 \text{ ft}^2} = 77,960 \text{ kg}$$

Total volume of water in one pore volume:

$$23 \text{ ft} \times 150,000 \text{ ft}^2 \times 0.32 = 1,104,000 \text{ ft}^3 \\ = 31,262 \text{ m}^3$$

$$\text{► Mass in one pore volume } \textcircled{A} 31,262 \text{ m}^3 \times 140 \times 10^{-3} \frac{\text{kg}}{\text{m}^3} \times 0.27 = 1,180 \text{ kg}$$

$$\textcircled{B} 31,262 \text{ m}^3 \times 140 \times 10^{-3} \frac{\text{kg}}{\text{m}^3} \times 0.008 = 35 \text{ kg}$$



BY UTP DATE 6/20/03 CLIENT _____ SHEET 8 OF 8
 CHKD. BY EDM DESCRIPTION _____ JOB NO. _____

► Pore volumes required for PCF removal

$$\textcircled{A} \quad \frac{77,960 \text{ kg}}{1,180 \text{ kg}} = 66$$

$$\textcircled{B} \quad \frac{77,960 \text{ kg}}{35 \text{ kg}} = 2,230$$

► Calculate time frame for pore volume extraction
 for extraction rate of 25 gpm

$$\textcircled{A} \quad \frac{8,260,000 \text{ gal} \times 66}{25 \text{ gpm}} = 41 \text{ years}$$

$$\textcircled{B} \quad \frac{8,260,000 \text{ gal} \times 2,230}{25 \text{ gpm}} = 1400 \text{ years}$$

► Incorporate effect of decreasing interface PCF concentration in the solution

$$\text{For the first } \frac{1}{4} = \frac{19,490}{1,180} = \frac{66}{4} = 16.5 \text{ pore volumes}$$

(19,490 kg)

$$\text{For the second } \frac{1}{4} = \frac{19,490}{1,180 \times \frac{0.027}{0.034}} = 21 \text{ pore volumes}$$

$$\text{For the third } \frac{1}{4} = \frac{19,490}{1,180 \times \frac{0.019}{0.034}} = 29.5 \text{ pore volumes}$$

$$\text{For the last } \frac{1}{4} = \frac{19,490}{1,180 \times \frac{0.01}{0.034}} = 56 \text{ pore volumes}$$

► Total number of pore volumes = $(16.5 + 21 + 29.5 + 56) = 123$ pore volumes

► Calculate time frame

$$\textcircled{A} \quad \frac{8,260,000 \text{ gal} \times 123}{25 \text{ gpm}} = 77 \text{ years}$$

APPENDIX 3
ESTIMATED COST FOR SOIL FLUSHING SYSTEM
Present Worth Basis
(for 25 gpm system)

Item/Description	Quantity	Unit	Unit Cost		Total Cost	
			Min.	Max.	Min.	Max.
CAPITAL COSTS						
Hydraulic Study	1	lump sum	\$15,000	\$50,000	\$15,000	\$50,000
Pilot Test	1	lump sum	\$30,000	\$50,000	\$30,000	\$50,000
Well Installation	12	each	\$1,200	\$2,000	\$14,400	\$24,000
Piping Installation	1,000	linear ft.	\$30	\$50	\$30,000	\$50,000
Total Capital Costs					\$89,400	\$174,000
OPERATION AND MAINTENANCE COSTS						
Annual Costs						
Carbon Usage(a)	1	lump sum	\$8,000	\$13,000	\$8,000	\$13,000
Labor	0.5	FTE	\$20,000	\$40,000	\$10,000	\$20,000
Total Annual Costs					\$18,000	\$33,000
PRESENT WORTH						
Duration = 30 Years						
Discount Rate = 7 Percent						
TOTAL					\$328,000	\$612,000

(a) Costs are based on estimated carbon usage rate of 0.5 lbs carbon per 1,000 gallons of groundwater treated. This estimate was provided by Calgon for removing PCP and naphthalene from groundwater (Keystone, 1991).

ESTIMATED COST FOR SOIL FLUSHING SYSTEM

Total Cost Basis
(for 25 gpm system)

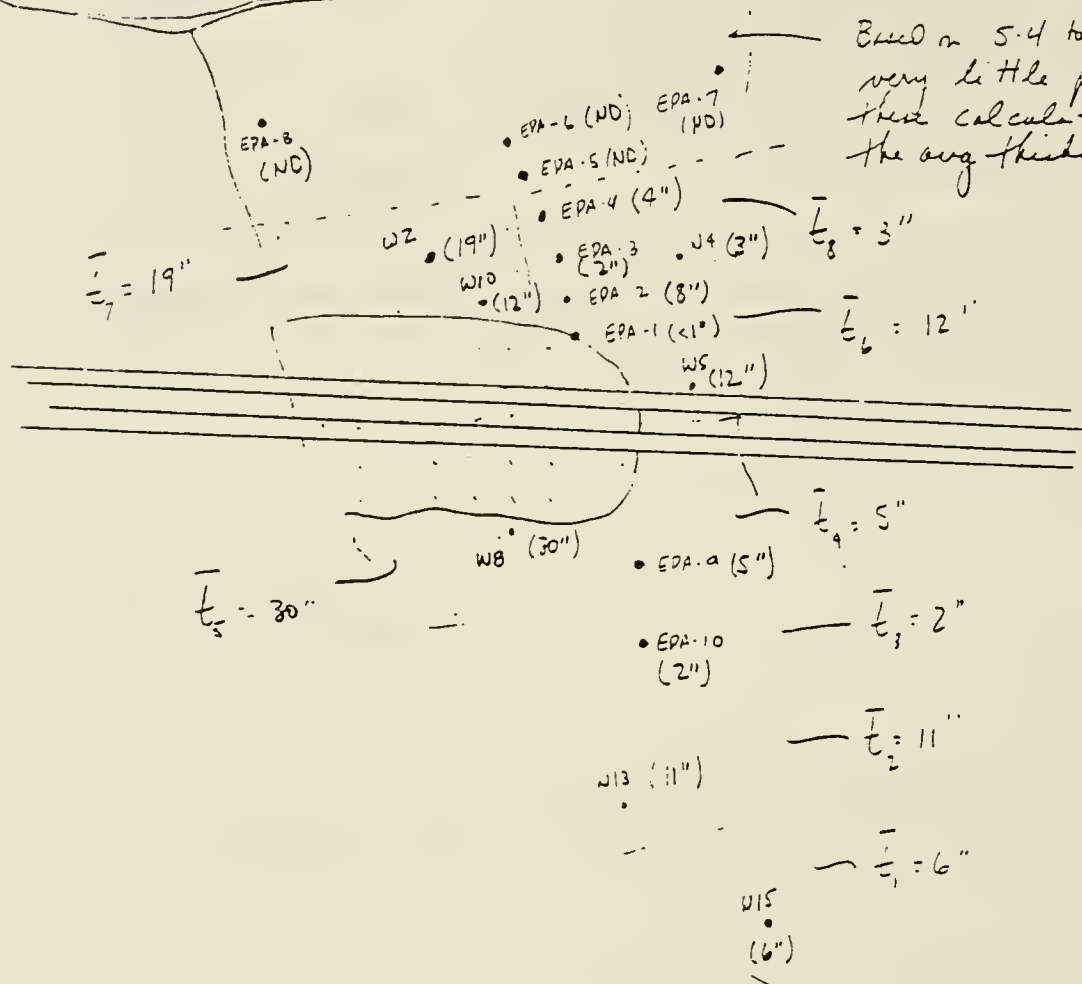
Item/Description	Quantity	Unit	Unit Cost		Total Min.	Cost Max.
			Min.	Max.		
CAPITAL COSTS						
Well Installation	12	each	\$1,200	\$2,000	\$14,400	\$24,000
Piping Installation	1,000	linear ft.	\$30	\$50	\$30,000	\$50,000
OPERATION AND MAINTENANCE COSTS (for 30 years)						
Carbon Usage(a)	1	yearly	\$8,000	\$13,000	\$240,000	\$390,000
Labor	0.5	FTE/yr	\$20,000	\$40,000	\$300,000	\$600,000
TOTAL COST					\$584,400	\$1,064,000

(a) Costs are based on estimated carbon usage rate of 0.5 lbs carbon per 1,000 gallons of groundwater treated. This estimate was provided by Calgon for removing PCP and naphthalene from groundwater (Keystone, 1991).



MONTGOMERY WATSON

BY C. Ford DATE 6-30-93 CLIENT ARCO - MDTP SHEET 1 OF 2
 CHKD. BY _____ DESCRIPTION 9% LNALP BENEATH INTERSTATE JOB NO. 3052 0054



Legend

• WX Approximate location of Monitoring Wells

• EPA-X Approximate location of EPA Extraction Well

(XX") Approximate Thickness of Product in Wells
 - Based on 5-4 to 5-5-93 Data

ND - No Data

$\bar{t}_i$ = average thickness in zone i ($i = 1, 2, 3, 4$)



BY C. Fox DATE _____ CLIENT _____ SHEET 2 OF 2
 CHKD. BY _____ DESCRIPTION % LNAPL Beneath Interstate JOB NO. _____

(1) Count # of Squares in Each Zone

$$\text{Zone 1} = 15$$

$$\text{Zone 5} = 24$$

$$\text{Zone 2} = 20$$

$$\text{Zone 6} = 43$$

$$\text{Zone 3} = 21$$

$$\text{Zone 7} = 14$$

$$\text{Zone 4} = 18$$

$$\text{Zone 8} = 13$$

(2) Multiply # of Squares by Avg. Product Thickness and sum all the zones

$$\begin{aligned} & 15(6'') + 20(11'') + 21(2'') + 18(5'') + 24(30'') + 43(6'') + 14(19'') + 13(3'') \\ &= 90 + 220 + 42 + 90 + 720 + 258 + 266 + 36 \\ &= 1,722 \end{aligned}$$

(3) Calculate $\left[\text{Squares} \times \frac{1}{5} \right]$ in accessible zone

$$\begin{aligned} &= 12(30'') + 3(5'') + 25(12'') \\ &= 360 + 15 + 300 \\ &= 675 \end{aligned}$$

(4) Ratio of $\left(\frac{3}{2} \right)$

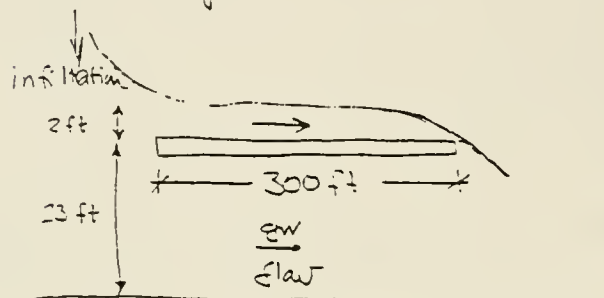
$$= \frac{675}{1722} = \boxed{40\%}$$



BY WTP DATE 7/1/83 CLIENT ARCO SHEET 1 OF 3
 CHKD. BY _____ DESCRIPTION _____ JOB NO. 3052.0054

Statement of the problem

- Estimate amount of diesel dissolved after 30 years of flushing



Assume that infiltration upgradient and pumping downgradient have resulted in a hydraulic gradient increase of $2\text{ ft}/300\text{ ft} = 0.0067$. This corresponds to an increase of the natural gradient by 100%. Therefore the velocity would be twice the velocity under natural gradient conditions of 0.3 ft/day (UBUG report, page 4-4).

- Calculate the average diesel concentration in groundwater above the NAPL lens

$$\frac{\bar{C}(L, Y)}{C_s} = \frac{1 - e^{-W^2}}{W\sqrt{\pi}} + \text{erfc}(W)$$

$$W = \frac{Y}{2\sqrt{\frac{D}{V} \times L}}$$

$$L = 300\text{ ft}$$

$$Y = 2\text{ ft}$$

$$V = 0.6\text{ ft/day}$$

$$C_s = 5\text{ mg/l}$$

D varies between 6×10^{-5} and 6×10^{-2}

$\frac{D}{V}$ varies between 1×10^{-4} and 1×10^{-1}

- Calculation for high end of coefficient of dispersion
 $D = 6 \times 10^{-2}$

$$W = \frac{2}{2\sqrt{0.1 \times 300}} = 0.2$$

$$\frac{\bar{C}}{C_s} = \frac{1 - e^{-0.2^2}}{0.2\sqrt{\pi}} + \text{erfc}(0.2) = 0.11 + 0.78 \rightarrow \boxed{\frac{\bar{C}}{C_s} = 0.89} \text{ above the lens}$$



BY _____ DATE _____ CLIENT _____ SHEET 2 OF 2
 CHKD. BY _____ DESCRIPTION _____ JOB NO. _____

> Calculation for low end $D = 6 \times 10^{-5}$

$$W = \frac{2}{2\sqrt{0.0001 \times 300}} = 5.8$$

$$\frac{C}{C_s} = \frac{1 - e^{-5.8^2}}{5.8\sqrt{\pi}} + 0 = 0.097$$

> Calculate areal diesel concentration in groundwater
below the NAPL lens

same as before, with $Y = 23 \text{ ft}$
 (instead of z)

High end
 for $D = 6 \times 10^{-2}$

$$W = \frac{23}{2\sqrt{0.1 \times 300}} = 2$$

$$\frac{C}{C_s} = \frac{1 - e^{-2^2}}{2\sqrt{\pi}} - \text{erfc } 2 = 0.277 + 0.004 \Rightarrow \boxed{\frac{C}{C_s} = 0.22} \text{ below the lens}$$

low end

for $D = 6 \times 10^{-5}$

$$W = \frac{23}{2\sqrt{0.0001 \times 300}} = 53.4$$

$$\frac{C}{C_s} = \frac{1 - e^{-53.4^2}}{53.4\sqrt{\pi}} - \text{erfc } 53.4 = 0.002 + 0 \rightarrow \frac{C}{C_s} = 0.002$$



BY UTP DATE 7/1/93 CLIENT ARCO SHEET 3 OF 3
 CHKD. BY _____ DESCRIPTION _____ JOB NO. _____

► Volume of water in the pore volume

above the lens $2,718 \text{ m}^3$

below the lens $31,262 \text{ m}^3$

total $\frac{33,980 \text{ m}^3}{= 8,980,000 \text{ gallons}}$

► At a rate of $50 \text{ gpm} = 26,289,000 \text{ gallons per year}$,
 after 30 years, 28 pore volumes will have been removed.

► Calculate mass of diesel in 28 pore volumes

Above the lens

$$28 \times 2,718 \text{ m}^3 \times 10^{-3} \frac{\text{kg}}{\text{m}^3} \times 0.89 = 1064 \text{ kg} \quad (35 \text{ kg/year})$$

Below the lens

$$28 \times 31,262 \text{ m}^3 \times 10^{-3} \frac{\text{kg}}{\text{m}^3} \times 0.88 = 3850 \text{ kg} \quad (130 \text{ kg/year})$$

Total $\frac{4,915 \text{ kg}}{\text{removed after 30 years}}$

$$\begin{aligned} \text{Total volume of diesel} &= 1.5 \times 150,000 \text{ ft}^3 \times 0.32 \\ &= 72,000 \text{ ft}^3 \\ &= 2,040 \text{ m}^3 \end{aligned}$$

$$\text{Total mass of diesel} = 2,040 \text{ m}^3 \times 0.96 \times 10^{-3} \frac{\text{kg}}{\text{m}^3} = 1,957,000 \text{ kg}$$

Percentage of total mass of diesel removed by

$$\text{flushing after 30 year} = \frac{4,915}{1,957,000} = 0.25\%$$

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July 7, 1993

BY FAX AND U.S. MAIL

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Montana Department of Health and Environmental Sciences
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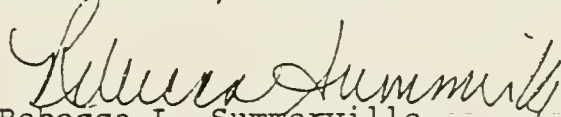
Re: Comments on the Montana Pole and Treating Plant
Feasibility Study and Proposed Plan

Dear Mr. Antonioli:

Enclosed for filing in the Administrative Record on the Montana Pole Superfund Site are comments on the Montana Pole and Treating Plant Feasibility Study submitted by Inland Properties, Inc., Montana Resources, Inc., and Dennis Washington.

Very truly yours,

DATSOPOULOS, MacDONALD & LIND, P.C.


Rebecca L. Summerville

RLS/jmc

encl.

RECEIVED

JUL 08 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

MONTANA POLE AND TREATING PLANT FEASIBILITY STUDY

COMMENTS SUBMITTED FOR THE ADMINISTRATIVE RECORD ON JULY 7, 1993

BY INLAND PROPERTIES, INC., MONTANA RESOURCES, INC., AND DENNIS WASHINGTON

Introduction

This document provides both general and section-specific comments of Inland Properties, Inc., Montana Resources, Inc., and Dennis Washington for the Montana Pole and Treating Plant Feasibility Study (FS).¹ General comments address major points of concern in the FS. Section-specific comments address issues of more limited scope.

General Comments

- (1) The Baseline Risk Assessment assumes future residential land use at the Montana Pole and Treating Plant (MPTP) site and also that future residents will use ground water from the underlying aquifer. Based on local zoning regulations and on the proximity of the site to the interstate and the active rail lines these are unreasonable assumptions. The future residential land use assumption greatly overestimates the health risks associated with the site and has led to unrealistic cleanup levels such as remediation of the aquifer to drinking water standards.
- (2) The active alternatives (3, 4, and 5) presented in the FS all involve excavation and surface treatment of contaminated soil. No alternatives are provided that include a combination of excavation and in situ process options. This has led to an alternative evaluation that is based solely on the relative volumes of soil excavated under each alternative. Considering the difficulty that will be encountered during excavation, alternatives composed of more innovative combinations of process options should have been provided for evaluation.
- (3) Excavation below the water table, as envisioned under Alternatives 4 and 5, will be very difficult in the fine-grained soils at the MPTP site and dangerous to site workers. The administrative record contains many references to flowing and caving sands encountered during excavations and drilling at the site. Excavation below the water table may also lead to greater PCP concentrations in the groundwater. Considering that a significant portion of the contaminated soil will be left under the interstate and the active rail lines, it is questionable whether excavation below the water table in the

¹ These comments are being submitted based on information provided by MDHES in the final RI/FS for the Site. By making these comments these parties do not necessarily adopt the conclusions reached by the agency regarding the nature and extent of contamination at the Site and hereby reserve all previously stated claims and defenses regarding the Site and the Site condition which have been asserted by each of them in the Montana Pole Plant litigation.

rest of the site is justified.

- (4) Treatment options for excavated soil will probably be limited to land-based biological methods. Incineration will likely be opposed by the local residents and soil washing does not appear to be feasible based on the recent treatability test. Land-based biological treatment of the contaminated soils, under any of the excavation alternatives, will be a slow process. Site area limitations will probably limit treatment to less than 30,000 cubic yards per batch. The treatment-space limitation will make Alternatives 4, and particularly 5, take much longer than estimated in the FS. There is no discussion of the health risks to workers and nearby residents associated with the land treatment of tens of thousands of cubic yards of contaminated soils at the site over many years.
- (5) It is very unlikely that any of the alternatives provided in the FS will meet the extremely low cleanup levels for soil and ground water in Tables 3-1 and 3-3. Even under Alternative 5, 41,000 cubic yards of inaccessible contaminated soil will remain at the site in contact with the ground water. Regardless of what occurs throughout the rest of the site, these contaminated soils will prevent the unjustified ground water cleanup goals from being achieved.
- (6) Considering that the possibility of achieving the soil and ground water cleanup levels mandated by the residential use assumption is extremely small and the potential for future residential land and ground water use are also very unlikely, capping of most of the subsurface soils should be considered a viable process option. It is not worth the risk to site workers and nearby residents to implement the very large-scale contaminated soil excavations and land treatments envisioned under Alternatives 4 and 5. Alternatives 4 and 5 would expose workers, trespassers, and nearby residents with the very soils from which these alternatives are attempting to protect them. It would be much safer to limit excavation to those contaminated soils that presently impact Silver Bow Creek and those that are at the land surface. The remainder should be capped to prevent potential exposure of the public to these soils.
- (7) No discussion is provided in the FS (or the RI) concerning temporal trends in either the LNAPL thickness or the concentrations of dissolved contaminants in the ground water. Was sufficient sampling conducted to adequately characterize the site if no significant changes have been noticed since 1985?

Section-Specific Comments

Section 2.1.4.8

LNAPL is known to be absent in several wells within the outlined area of the plume as shown on Figure 2.16. Therefore, as stated in the FS, the estimate of 370,000 gallons for the LNAPL plume is likely a gross overestimate and LNAPL is probably present in preferential flow pathways beneath the site and absent in many other areas. This will have a major practical impact on excavation alternatives which dictate the removal of LNAPL and contaminated soil at and below the water table throughout the plume area.

Section 2.2.1

The major sources of contamination at the site are listed as the Plant Process Area, the Wastewater Discharge Ditch and Sedimentation Ponds, and the LNAPL plume. The EPA injection galleries, particularly the southeast injection gallery, should also be considered a source of ground water contamination. Millions of gallons of water that contained up to 24,000 ug/L of dissolved PCP were injected into this gallery and it should also be identified as a source.

Section 2.4.1.2

The FS states that "although future residential land use may be unlikely, residential development was considered in the baseline health risk assessment". It also states (pg. 2-34) that "ingestion of ground water (assumably by future site residents) poses the greatest carcinogenic risk and the greatest non-carcinogenic risk". Consequently, risk-based cleanup levels from the BRA were developed assuming residential land use at the site and also the use of the underlying ground water for domestic purposes.

Neither the residential land use scenario, nor the use of ground water by future residents is a reasonable maximum exposure assumption for the site. Clearly, with the proximity of the interstate highway and railroad lines, industrial land use is the expected future of the MPTP site. Moreover, the MPTP site is covered by the Butte/Silverbow Ordinance #431 which mandates use of the public water supply system and prohibits new water wells for domestic purposes within the City/County limits. -- Therefore, the residential land use scenario and particularly, the assumption of ground water use by future residents are not justified.

As a result of the unreasonable and unjustified residential land use assumption in the BRA, the health risks at the site are vastly overstated. Tables 2-12, 2-13, and 2-14 list the estimated total risks for current on-site trespassers, future on-site workers, and future residents, respectively. The estimated total cancer risk is within the EPA-suggested 10^{-4} - 10^{-6} range for industrial land-use scenarios. However,

the assumption of future residents using ground water from beneath the site generates a total cancer risk of 1.53×10^{-1} .

In addition, because of the residential land-use scenario, risk-based Preliminary Remedial Action Goals, shown on Tables 3-1 (soils) and 3-3 (ground water) are lower than MCLs for ground water and EPA-recommended cleanup levels for dioxins/furans. See the following discussion for Section 3.2.1.

Section 3.2.1 Preliminary Remedial Action Goals

The MDHES has developed risk-based PRAGs based on the future residential land use scenario and the assumption that future residents will use ground water from wells. This scenario is used despite the extremely low potential for residential land use at the MPTP site and the local ordinance that prohibits the installation and use of wells for domestic purposes within the City/County limits. These extraordinarily low PRAGs mandate cleanup alternatives that may be dangerous to remediation workers and may pose significant health threats to nearby residents.

The FS states that the EPA recommends dioxin/furan cleanup levels of 1 ppb for residential sites and 20 ppb for industrial sites. The largest TCDD-equivalent concentration reported for soil at the MPTP site was 16 ppb. This is below the EPA's recommended level for industrial sites. If the proper assumption had been made for future land use of this site, soils already meet EPA recommendations.

However, the BRA, assuming residential land use, develops a PRAG for dioxin/furan in soils at 100 parts per trillion (ppt). This is two orders of magnitude lower than the EPA-recommended level for residential land.

Similarly, the risk-based ground water PRAGs are lower than their respective MCLs for drinking water for all of the site contaminants. Table 3-3 lists the MCL for dioxin/furan at 0.00005 ug/L or 50 parts per quadrillion (ppq) and the risk-based PRAG as 0.0000005 ug/L or 0.5 ppq. It is assumed here that the units shown in Table 3-3 are incorrect for dioxin/furan and should indicate the MCL as 50 ppt and the PRAG as 0.5 ppt. Regardless of the mistake in units, risk-based PRAGs that are two orders of magnitude lower than the respective MCLs simply cannot be considered credible. For instance, Table 3-3 lists the PRAG for arsenic as 0.04 ppb (40 ppt) while the MCL for arsenic is 50 ppb, over three orders of magnitude higher than the PRAG. It is unlikely that any natural ground water in Montana, much less in the Butte area, has an arsenic concentration less than 40 ppt.

The impact of these extraordinarily low PRAGs is to drive the cleanup of the MPTP site towards excavation alternatives that may be dangerous to remedial workers and may pose significant short-term (10 to 20 years) health threats to surrounding residents.

Section 4.2.3 In Situ Treatment Technologies for Soils

The FS only considers in situ bioremediation options that involve the use of water as a carrier of oxygen to the contaminated soil. Water is a very inefficient carrier of oxygen and nutrients, particularly in interlayered and fine-grained aquifers such as at the MPTP. Neither soil venting nor air sparging was considered as an in situ bioremediation method in the FS or in the Alternative Screening Document (Keystone, 1991a). Soil venting and air sparging are innovative technologies gaining wide favor for remediating petroleum-based contaminants. Ward and Wilson (1986) estimate that air is over 1,000 times more effective than water at delivering oxygen to petroleum-degrading bacteria.

Soil venting is a process where air is injected into the contaminated soil to increase the soil gas oxygen concentration and therefore increase aerobic degradation of hydrocarbons. It has been used effectively at several sites to remediate petroleum contaminated soils above the water table (Miller and others, 1992; Downey and others, 1990). Similarly, air sparging is a process where air is injected below the water table. This increases both the dissolved oxygen concentration in the ground water and the oxygen concentration in the soil gas in the smear zone above the water table.

If in situ bioremediation is potentially effective, as is indicated by the Keystone treatability tests (Keystone, 1991b), then soil venting and air sparging could provide an attractive alternative to the massive excavations and surface treatments envisioned under Alternatives 3, 4, and 5 in the FS.

Section 4.2.4 Aboveground Soil Treatment Technologies

The aboveground soil treatment technologies which are retained for further evaluation in the FS include on-site incineration, biological land treatment, and soil washing. The FS insinuates, and comments at the May 25, 1993 public meeting clearly indicate, that on-site incineration is not a method that would be acceptable to the community. Therefore, the only two viable aboveground treatment options are biological land treatment and soil washing.

Section 4.2.4.2, Biological Land Treatment

The FS evaluates landfarming and composting as the two potential land treatment processes for excavated soil. Although it is likely that both of these processes will enhance degradation of the petroleum hydrocarbons and PCP, both will be much less effective during the late fall, winter, and early spring when the average air temperature is low, and both may pose significant hazards to surrounding residents.

Bioremediation by landfarming typically involves spreading contaminated soil to thicknesses of approximately 1 foot and tilling the soil to enhance aerobic biodegradation. Landfarming of 20,000 cubic yards of soil would require approximately 600,000 square feet of area. Considering the large portion of the site proposed for excavation, landfarming would have to be restricted to the Pole Storage Area east of the former Pole Plant.

Bioremediation by composting is envisioned to involve mixing the contaminated soil with a bulking agent (presumably sand) in a pile and introducing air into the pile to stimulate aerobic degradation. Although this method may work, it is not substantially different than in situ soil venting but would require extensive excavation and the human and environmental risks associated with excavations in unstable soils.

Section 4.2.4.3, Soil Washing

Soil washing is considered in the FS as a viable alternative for aboveground soil treatment. The effectiveness and economics of soil washing are dependent on the grain size distribution of the contaminated soils. Soil washing is generally not considered viable if a significant fraction of the contaminated soil is silt- or clay-sized (EPA, 1990). Hydrophobic contaminants, such as those present at the MPTP, tend to bind strongly to finer-grained soil particles making treatment much more complicated and increasing the volume of post-washing residuals.

It was estimated in the FS that more than 95 percent of the site soils have a grain size larger than silt or clay (Keystone, 1991c). This was based on backhoe test pit soil samples collected at the site. However, based on the cross-sections shown in Figures 1.6, 1.7, and 1.8, much more than 5 percent of the site soils appears to be silt and clay. This is particularly true along the historic drainage ditch and sedimentation pond areas that are identified as heavily contaminated with wood treating fluids. In addition, excavation and handling of soils tends to increase the fraction of fine material. Therefore, it is likely that much more than 5 percent of the site soils are silt and clay. This will drastically decrease the effectiveness of soil washing

and greatly increase the treatment cost, treatment time-frame, and volume of residuals present after soil washing.

Section 4.4 Ground Water Remedial Technologies

Section 4.4.1 Containment Technologies

The FS states that containment technologies such as slurry walls may not be effective due to the lack of a low-permeability zone to form the base of the containment wall. However, very few sites where slurry walls are used actually have an effective low-permeability layer to anchor the wall. This should not, by itself, rule out the use of containment technologies at the MPTP site.

LNAPLs, particularly diesel-fuel carried contaminants, do not readily dissolve and migrate to depth in a relatively fine-grained and layered aquifer such as at the MPTP site. This would be particularly true at the MPTP site where there is very little seasonal change in the water table elevation. Unfortunately, this situation has been complicated by the injection of PCP-contaminated water at the site. In the absence of this injection, it is likely that contaminants would not be present to any significant depth below the LNAPL plume and containment technologies, perhaps in conjunction with other in situ remedial technologies, would be viable alternatives.

Section 4.4.2 Extraction/Collection Technologies

The FS indicates that it would be important to "maintain the hydrologic balance across the site". Simplified hydraulic calculations presented in the FS estimate that approximately 35 gallon per minute (gpm) of the water extracted by recovery systems should be discharged to Silver Bow Creek (SBC) to maintain this balance. Under the assumed ground water and LNAPL system (described in Section 4.4.2.1), a total of 95 to 115 gpm would be pumped from the recovery system. After treatment approximately 60 to 80 gpm would be injected upgradient of the plume and 35 gpm would be discharged to SBC to maintain the hydrologic balance.

It is not clear why it is necessary to maintain the hydrologic balance across the site. Injection of treated water upgradient from the site poses several risks and many practical problems. The risks of injection are due to the fact that it is very difficult to predict the impact of injecting water into a fine-grained, layered aquifer such as that beneath the MPTP site. It is quite possible that injection could push free product or dissolved contaminants through previously unrecognized preferential flow paths into areas where remediation is difficult. It could also cause the

dissolved portion of the plume to migrate out of the influence of the recovery systems.

From a practical standpoint, injection wells and galleries are very oversight-intensive. This is because they are very susceptible to fouling from scale buildup and biological plugging of the well screen and filter pack, particularly in fine-grained sediments. Fouled injection wells cause increased back pressures in the injection pipeline and run the risk of causing pipeline breaks if not properly monitored. Fouled wells also require excessive redevelopment, and often replacement.

At best, injection systems are a nuisance and at worst they can make site remediation more difficult. Therefore, unless there is an overriding technical justification to inject treated water, all produced water should be treated and discharged to SBC.

The EPA is presently operating a system of 10 two-pump recovery wells and an extensive water treatment facility at the site. The combined free product recovery through this system is estimated at 50 gallons per day. Considering that the system has already been constructed and is operating, it is reasonable that it should be considered a part of any future recovery system constructed at the site.

Section 4.4.4 Aboveground Treatment Technologies

The FS considers the possibility of additional water treatment to remove metals from carbon-filtered water prior to discharge to SBC. What are the metals concentrations in the effluent of the EPA's present water treatment facility?

Section 4.4.4.4 Oil/Water Separation

Oil/water separation as a pretreatment before carbon filtering will probably be required for waters pumped from recovery trenches. This is particularly true if water and product are to be recovered from a trench as 'total fluids' with a single pump. Total fluids pumping tends to emulsify product and make oil/water separation expensive and inefficient. The effluent of the oil/water separation process typically has a larger dissolved petroleum content and therefore consumes activated carbon more quickly.

The EPA is presently recovering from wells with two-pump systems. This provides better separation of fluids and decreases carbon consumption. Decreased carbon consumption will decrease the amount of hazardous waste that must be shipped from the site and regenerated.

Section 5.0 Development and Screening of Alternatives

This section screens the alternatives for effectiveness, implementability, and cost. One aspect that is missing in the screening (and also the detailed analysis) of alternatives is the area within the site that is available for the various treatment options. The entire MPTP site is approximately 55 acres (2,400,000 ft²). Within this area, only approximately 1,000,000 ft² (the Pole Storage Yard) is realistically available for biological land treatment. This restricts the amount of soil that can be land treated during any one period of time. This issue is addressed below for each alternative.

Section 5.1 Development of Remedial Alternatives

Alternative 3

The excavation envisioned under Alternative 3 would generate approximately 23,000 yd³ of contaminated soil. Landfarming this volume of soil would require 621,000 ft² of area if it were spread to the typical 1 foot thickness. Considering the area required for fences and setbacks, this would be close to the maximum amount of soil that could be landfarmed at one time in the Pole Storage Yard area.

The preliminary ground water extraction system envisioned for Alternatives 3,4, and 5 includes four 425-foot-long recovery trenches. The EPA had considerable problems with flowing sands during trench excavations and abandoned their use for the 1992 system. This along with the increased water treatment costs associated with the use of recovery trench use makes it unreasonable to plan for the extensive use of recovery trenches in a ground water extraction system at the MPTP site.

The proposed injection of treated water upgradient from the site should be reevaluated based on the comments given for Section 4.4.2.

Alternative 4

Alternative 4 envisions excavation and treatment of approximately 105,000 cubic yards of contaminated soils and also treatment of 10,000 cubic yards of bagged soils. Soils from the process area and historic drainage ditch would be excavated to approximately 4 feet below the water table.

The FS estimates that land treatment of these soils would take approximately 2 years per batch. Considering that enough space is available to treat only 20,000 to 30,000 cubic yards of soil at one time, this alternative would require a minimum

of 8 years and more likely 12 years to complete land treatment.

Excavation of contaminated soils below the water table at the MPTP site would be a very difficult and dangerous undertaking. The record for the site contains many references to flowing sands encountered during excavations and drilling. It should be assumed that much more than the estimated volume of soil will have to be excavated to actually remove the contaminated soils below the water table. Even above the water table, fine-grained soils, such as those at the MPTP, must either be shored or sloped back at 3:1 for safe excavation. This will require massive over-excavation of uncontaminated soils, particularly on the southern portion of the site where the water table is 20 feet below the ground surface.

Excavation below the water table will emulsify some of the product and will greatly increase the dissolved PCP concentration in the shallow ground water. Even if much of the free product can be removed by skimming from the "pond" remaining after excavation, it is likely that backfilling with clean soils will lead to contamination of these soils.

The FS indicates that soils excavated from below the water table would have to be dewatered prior to incineration and biological land treatment but would not require dewatering prior to soil washing. It is completely unrealistic to assume that soil would not require dewatering prior to soil washing. Soil stockpiling will be required under any soil treatment option to prevent delays in the treatment process from shutting down the excavation, and vice-versa. It would be very difficult to stockpile saturated soils prior to soil washing without causing contamination of the underlying surface soil. It would also be very difficult to transport saturated soils from the excavation to the soil stockpile without contaminating the surface soils along the haul route. It will even be difficult to excavate soil from below the water table without spilling product and contaminated water all over clean soils in the work area.

A contaminated soil stock pile will be necessary under all treatment alternatives and a contaminant area for this stockpile must be included in estimates of the costs, handling time-frame, and health and environmental threats associated with all excavation alternatives.

Section 5.2.5 Alternative 5

Alternative 5 includes the excavation and treatment of 198,000 cubic yards of contaminated soil plus 10,000 cubic yards of bagged soil. Due to space limitations at the MPTP site, treatment of this volume of soil by landfarming would be

limited to 20,000 to 30,000 cubic yards at a time. Assuming a two year treatment period, as estimated in the FS, this would require 13 to 21 years of operation to complete.

Treatment by composting/aeration may enable a larger volume of soil to be treated per batch. However, treatment by composting is not significantly different than in situ bioremediation by soil venting or air sparging. If effective, these in situ methods would not require the massive excavation with all the associated risks and problems.

The FS states that there is a potential for workers, site visitors, and nearby residents to be exposed to hazardous substances during implementation of Alternative 5. However, the FS provides no explanation of these hazards. Under Alternative 5, over 200,000 cubic yards of contaminated soil will be excavated. All three treatment options will require large stockpiles or landfarms for the contaminated soil. Due to the space limitations and treatment times for landfarming, this landfarm will have to be operated for 10 to 20 years. The risks to workers and nearby residents resulting from potential exposure to these soils should be reviewed very carefully. The total human health risk from excavating and exposing all of the contaminated soils may be very significant and should be evaluated against the benefits of this type of excavation.

As discussed above for Section 4.2.4.3, the effectiveness of soil washing is dependent on the grain size distribution of the contaminated soils. Based on the cross-sections shown in Figure 1.6, 1.7, and 1.8, it appears that much more than 5 percent of the site soils are silt and clay. This will greatly affect the effectiveness and economics of soil washing.

Section 6.0 - Detailed Analysis of Selected Remedial Alternatives

The detailed analysis of alternatives evaluates each alternative against the nine criteria and then provides a comparative analysis between alternatives. The following comments pertain to both the evaluation of individual alternatives and the comparative analysis.

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A deficiency in the FS is the similarity between Alternatives 3, 4, and 5. The ground water containment and extraction systems for Alternatives 3, 4, and 5 are identical. Alternatives 3, 4, and 5 each involve excavation and aboveground treatment of contaminated soils, the only differences being the volumes of soils excavated.

Alternatives should have been developed that contain more

innovative combinations of excavation and in situ treatments so that the comparison of alternatives would not be based solely on the relative volumes of soil removed. At least one alternative should be provided that includes excavation of the reasonably accessible contaminated soils for aboveground treatment along with some form of in situ treatment of the soils that are much more difficult and dangerous to excavate.

SUMMARY COMMENTS

By making the unreasonable assumption of future residential land use at the MPTP site, the BRA overstates the health threats caused by contamination at the site. The overstated risks have led to the development of remedial alternatives that involve massive excavations and surface treatments for the contaminated soils. Implementing these excavations, particularly alternatives 4 and 5, may involve very significant risks for remediation workers and nearby residents for periods of 10 to 20 years. These risks are not articulated appropriately in the FS.

With the exception of No Action and Institutional Controls, the alternatives evaluated in the FS all involve excavation and surface treatment of contaminated soils by either land treatment, soil washing, or on-site incineration. Based on comments at the May 25, 1993 public meeting, on-site incineration appears to be a very unlikely treatment alternative. As a result, all active alternatives involve large excavations and treatment alternatives appear to be limited to surface biological treatment and soil washing.

There are significantly practical problems with all of the excavation alternatives, not the least of which is the very serious difficulty and danger of excavating below the water table in unstable, fine-grained soils. Surface treatment of these soils, either by landfarming, composting, or soil washing will require large stockpiles of heavily contaminated soils to be present on the site for many years. These treatment alternatives would be less effective and more difficult during the winter months and the stockpiles would pose a significant human health hazard to workers and nearby residents for many years.

A deficiency in the FS is the failure to evaluate innovative technologies. No in-situ biological treatment options utilizing soil venting or air sparging were evaluated. At a minimum, a treatability test evaluating the effectiveness of soil venting and/or air sparging should have been implemented. Water-based bioremediation treatability tests conducted by Keystone (1991a) indicate that biodegradation of the petroleum and PCP is feasible. Soil venting and/or air sparging may

also prove feasible, particularly because air is a much more effective carrier for oxygen than water.

Surface landfarming or composting are slow processes which, under alternatives 4 and 5, would occupy a large portion of the site and require many years to implement. In contrast, air sparging and/or soil venting could be implemented throughout the entire site quite rapidly. Even if the treatment period for soil venting/air sparging were 5 to 10 years, the cleanup period would be similar to Alternatives 4 and 5 and the extensive and potentially dangerous excavations would not be required. Furthermore, in situ methods would greatly reduce the potential risks to human health and the environment caused by excavation, stockpiling, and treatment of tens of thousands of cubic yards of heavily contaminated soils over a period of 10 to 20 years. Soil venting and/or air sparging could also be implemented beneath the interstate and active rail lines and in conjunction with soil caps at the site.

BUTTE-SILVER BOW

COURTHOUSE
BUTTE, MONTANA 59701

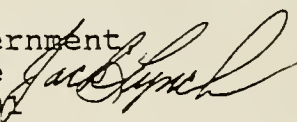
OFFICE OF
CHIEF EXECUTIVE

AREA CODE 406
PHONE 723-8262

MEMORANDUM

Date: July 6, 1993

TO: Montana Department of Health and Environmental Sciences
Attention: Brian Antonioli, Project Manager
Cogswell Building, P.O. Box 200901, Helena, MT 59620

FROM: Butte-Silver Bow Local Government
Jack Lynch, Chief Executive 
Courthouse, Butte, MT 59701

RE: Comments on Cleanup Alternatives for the Montana Pole Site

It is our view that there appears to be a great deal of consensus about many aspects of the cleanup remedies. As we understand it, all parties agree that:

1. The surface contamination areas (hot spots) should be remediated, including all contaminated materials near or adjacent to Silver Bow Creek;
2. The soils stored in the metal buildings since 1986 should be treated and reused on-site;
3. Bioremediation is the preferred alternative to treat the contaminated soils;
4. Some level of pumping and treating to limit or eliminate the contamination of ground water will be needed for many, many years until we are all reasonably assured we have extracted most of the pollution and its threat to the ground water;
5. A set of institutional controls will be needed and implemented to ensure long-term maintenance of the selected remedy, and this program will be fully funded to cover all anticipated costs and necessary services, including operation and maintenance of the treatment plant, land uses, etc.; and

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Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

6. Alternatives 1 & 2 as outlined in the MDHES document and the Remedial Investigation/Feasibility Study do NOT provide long-term protection of human health and the environment.

Clearly, a major decision is needed in choosing among Alternatives 3, 4, or 5, and we appreciate the painstaking effort to evaluate the technical merits of these proposed alternatives. We also fully understand there would be obstacles, technically and legally, to get started without this decision in place.

But nothing stops us from being creative and flexible. The County believes all parties should fully recognize the consensus that does exist and get started immediately on several tasks. Concurrently, as the technical issues are resolved regarding a preferred alternative, we could proceed with and complete the implementation of the remedy everyone can support.

Now, with regard to the alternatives, the County recognizes its responsibility to contribute to the decision-making process. We believe the best input we can offer at this point is to state clearly the County's priorities -- what we believe should be considered in choosing among the alternatives.

- First, we support the solution that relies on the best scientific advice and information, and removes the maximum amount of pollution from the area. This solution must be practical, both in terms of technical effectiveness as well as cost. For example, there is considerable disagreement on two major issues: 1) the standard to which the groundwater can be cleaned based on the amount of product and materials in and around the groundwater to be removed, and 2) the cost of handling excavation and backfill materials. We believe these issues should be resolved before the remedy is selected.
- Second, we support the solution that uses bioremediation technologies. We simply must demonstrate the link between the problems we face in Butte and technology development. Bioremediation holds great promise as a useful tool to deal with pollution and the Montana Pole Site is ready to take advantage of the benefits derived from its implementation. Consequently, the County prefers the 'B' options among the Alternatives.
- Third, we support the solution that ensures the MT Pole site can be remediated in sync with the cleanup of the full Lower Area One site. Any delay in the LAO work schedule is intolerable, and the linkages between LAO and MT Pole must be adequately addressed in the Montana Pole decision-making process. Let us plan properly for the relationships between various sites within our one community.

- Fourth, we support the solution that results in an acceptable land use in the long-term, for example, as part of a 'greenbelt corridor' for which planning is underway for the areas to the east, north, and west of the site. While the County holds no unrealistic expectation that the site will be remediated to its pristine status of the pre-1860's, neither will a remedy be tolerable if the area/land cannot be used by present and future residents for some worthy purpose.

-- In this regard, there has been much talk about a clean up to support 'residential' uses vs. a clean up that would support 'industrial' uses. Recognizing fully the rights of the current property owners, Butte-Silver Bow urges compromise. Further, if there is any advantage to changing existing zoning ordinances and land use policies that would allow for an orderly, timely, effective cleanup, the County is willing to consider such changes.

- Finally, fifth and perhaps most importantly, the local government of Butte-Silver Bow supports the solution that has the support of its citizens. To date, the clearest messages are: 1) clean it up as well as can be done and 2) we're tired of talk and studies, let's get it done. We believe these messages should drive the decision.

When considering these priorities, then, the County is very serious about asking the MDHES to move this process along quickly and getting the work started. Further, the County believes every effort should be made to implement an alternative that guarantees implementation will not be compromised by technical problems nor cause delays.

The current debate over Alternatives during the comment period has been counter-productive. There has been too much emphasis on singular points of contention and insufficient focus on issues of consensus. We urge all parties to consider all ideas and possibilities, and as needed, to compromise. Not to compromise human health nor environmental protection, but to negotiate the best solution that makes the most sense and recognizes long-term clean-up realities. We would also urge the MDHES and its federal counterpart, the EPA, to continue to include the County and its residents, along with the PRP's in the decision-making process.

Thank you for the opportunity to submit these comments.



The Big Sky Country

B. Robinson

W.J. Opitz *WJO*

Curt

Steve

MONTANA HOUSE OF REPRESENTATIVES

REPRESENTATIVE FRITZ DAILY

HOUSE DISTRICT 69

HELENA ADDRESS:

CAPITOL STATION

HELENA, MONTANA 59620

HOME ADDRESS:

1057 W. STEEL

BUTTE, MONTANA 59701

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JUN 07 1993

MONES
DIRECTOR'S OFFICE

June 4, 1993

Mr. Bob Robinson, Director
Montana Department of Health and Environmental Sciences
Cogswell Building
P. O. Box 200901
Helena, MT 59620

Dear Bob:

I would like to go on record as offering my support for cleanup alternative number five, as proposed by the Montana Department of Health and Environmental Sciences for the Montana Pole Plant site.

As you know, I have been very actively involved in the deliberations concerning the Superfund Process in Butte. My major area of concern has always been the terrible legacy we are leaving for our children. As we work through the process it is imperative that we find the most economical solutions. It is also imperative that we find solutions that will ultimately solve the problems. The worst mistake we could make would be to use temporary solutions which will ultimately require further remediation in the future.

I have stated on numerous occasions that I strongly feel the irresponsible decisions being made by the Environmental Protection Agency and ARCO will eventually lead to making Butte, Montana the nations next Love Canal. The proposal to use alternative number three is another example of those irresponsible decisions.

I find it ironic that ARCO would publicly state that it is impossible to clean the contaminated aquifer underneath the Montana Pole Plant site to its original state. However, the negotiated settlement agreement concerning the Berkeley Pit allows for aquifer contamination on a much greater scale. Comparing the Montana Pole Plant site and the Berkeley Pit is like comparing a small brush fire to the Yellowstone Park fires of 1988.

Sincerely,

Fritz Daily
Fritz Daily

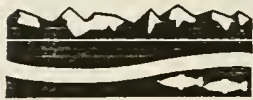
cc: Butte Press

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JUN 11 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

THE
Clark Fork
Pend Oreille
COALITION



July 7, 1993

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JUL 08 1993

Mr. Brian Antonioni, Project Manager
Montana Department of Health and
Environmental Sciences
P.O. Box 200901
Cogswell Building
Helena, MT 59620

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

RE: Montana Pole Treatment Plant Public Comment

Dear Brian:

The Clark Fork - Pend Oreille Coalition supports the State's "Proposed Plan" for remediation of contaminants at the MPTP in Butte, and has identified potential additions and modifications to that plan. Our specific comments are as follows, along with some concerns which might be addressed in the Design/Workplan stage of the process and/or in the Silver Bow Creek/Streamside Tailings OU:

1. Volume: We feel it is essential that all 195,000 cu. yds. of "accessible" soils be excavated and treated, as well as the previously removed 10,000 cu. yds. of soils stored in pole barns on site.-

In addition, the Coalition urges excavation of the remaining 10% of contamination, principally under the Interstate 90 overpass. We understand this can be excavated and treated for approximately 10% of the cost of your Proposed Plan, including removal and rebuilding of the highway bridge. The ability to neutralize this remaining 10% for a 10% increase is excellent. It would be inappropriate not to do so.

2. Treatment: We prefer bioremediation, as outlined in the State's Proposed Plan, and underscore the need that this be done in above-ground closed containers so that no harmful chemicals escape to the atmosphere.

Before on-site implementation of any fungal or bacterial remediation, it is suggested laboratory studies be conducted to identify specific end-products of chemical recombinations that occur during fungal or bacterial degradation, thus assuring only non-harmful constituents remain (e.g., CO₂, H₂O).

Because newer technology using White Rot Fungus may reduce cleanup time from 11 to four years, we support investigation of that method before turning to indigenous bacterial remediation.

P.O. Box 7593
Missoula, MT 59807
406/542-0539

P.O. Box 4718
Butte, MT 59702
406/723-4061

P.O. Box 1096
Sandpoint, ID 83864
208/263-0347

pertinent laws), as well as meet Maximum Contaminant Level Goals of the Safe Drinking Water Act and the Clean Water Act. However, the National Contingency Plan gives EPA site project managers broad authority to allow variances from these standards on a site by site basis.

Close on the heels of enactment of SARA, "Environmental Reporter" in a special report on "Superfund II" (Part II, Vol. 17, No. 42 of February 13, 1987 published by the Bureau of National Affairs) states on pg. 40: "Section 121(b)'s 'preference' for application of a 'permanent' solution' at Superfund sites 'to the maximum extent practicable' is one of the most critical aspects of the new law." The report recognizes that House and Senate leaders did little to clarify the interplay between the bias in favor of 'permanent' treatment and evaluation of effectiveness of proposed remedies. It goes on to provide insight to Congressional intent by explaining what took place on the floor of House and Senate: "Members divided themselves into two camps. They either emphasized that the statute's cost-effectiveness requirement should be relied upon to avoid overly expensive, unrealistic 'permanent' treatment approaches, or they argued that the strong preference in the amendments for permanent treatment cannot be overridden by cost considerations."

Senator John Chafee (R-RI), felt preference for permanent treatment means "permanent treatment technologies must be chosen whenever they are feasible and achievable." He pointed out that permanent treatment preference is a separate requirement that must be met before the cost effectiveness test is applied lest remedies such as capping a site or building a slurry wall to prevent further leakage would always be selected as a cheaper alternative. Chafee stated, "The extent to which a particular technology or solution is feasible or practicable is not a function of cost. A determination that a particular solution is not practicable because it is too expensive would be unlawful" (Cong. Rec. S 14925 (Oct. 3, 1986)).

Rep. Norman F. Lent (R-NY) disagreed: "It is our intent that the Administrator take into account several factors in determining whether a solution is practicable, including technical feasibility, cost, State and public acceptance of the remedy and other appropriate criteria" (132 Cong. Rec. H. 9566 Oct. 8, 1986).

Sen. George J. Mitchell (D-Maine) interpreted "permanent and significant reduction..." to require the "lowest levels achievable with available technologies" (Cong. Rec. S 14914 Oct. 3, 1986). In response, Lent said, "rather, it requires the EPA to carefully consider permanent remedies and select a permanent solution to the maximum extent practicable, if it provides a cost-effective response and if it protects the public health and the environment. In other words, although this section

establishes strict standards for cleanups, it does not direct the selection of foolish, costly remedies where alternative cost-effective remedies protect the public health and the environment" (132 Cong. Rec. H 9567 Oct. 8, 1986).

Split interpretation occurred also between the House Committee on Energy and Commerce and the House Committee on Public Works and Transportation. Energy and Commerce adopted a cleanup standard that required protection of human health regardless of cost; cost effectiveness was for use in choosing among remedies that meet the basic health standard. They also required that the long-term costs of non-permanent treatment be included in evaluating cost-effectiveness, and that otherwise cost-effective remedies must use permanent solutions to the maximum extent practicable (H. Rep. 253, 99th Cong. 1st Sess). A few members of the above Committee rejected this approach. They wanted to require, not just suggest, EPA apply permanent remedies whenever such were "feasible and achievable." They felt cost-effectiveness could be considered with regard to "feasibility" of a permanent solution, but sought to mandate permanent solutions whenever possible.

The Public Works and Transportation Committee adopted the opinion of the vocal minority from the Energy and Commerce Committee. Their recommended approach considered cost-effectiveness, but mandated EPA select permanent treatment "to the maximum extent practicable" whenever permanent treatment is "feasible and achievable." In the case that permanent treatment might be prohibitively expensive, they would require an "interim solution" be selected where permanent is not feasible, achievable and practicable (H. Rep. No. 253, 99th Cong., 1st Sess).

The final language of the statute is considered to be a compromise between the two above approaches. By contrast, and as shown above, language in the 1990 National Contingency Plan switches emphasis from "permanence" to "cost effectiveness" and dilutes Congressional intent far beyond even the most extreme interpretations cited by "Environmental Reporter" above.

- A good example of a proposed remedy that flies in the face of Congressional intent is ARCO's preferred remedy for the Montana-Pole-Treatment Plant Superfund site in Butte. The State/EPA proposed plan calls for excavation and destruction of the cancer-causing toxins through which groundwater flows into Silver-Bow Creek. ARCO prefers to cap the site and rely on a groundwater pump-and-treat facility forever rather than spend an additional seven to 20 million of "today's dollars" for the permanent remedy. Actual cost of ARCO's plan would obviously be far more than the permanent cleanup, but this is not recognized because of EPA's policy to show only 30 year costs!

What will happen in the future to assure impermanent

remedies chosen today are reliable and maintained? Local governments are encouraged to accept responsibility for management and repair of such facilities as Anaconda's Old Works, capped by a snazzy golf course. Such "institutional controls" put the burden on the backs of the local citizens. The presumption that man can control events in geologic time, for though no engineer will state there is such a thing as an impermeable repository, those for Beryllium and arsenic buried on Smelter Hill in Anaconda will be "reviewed every five years for a while until someone decides enough is enough" according to a top EPA official.

In conclusion, EPA has mismanaged the intent of Congress in SARA by promulgating a National Contingency Plan and CFR's that ignore the strong sentiments of Congress for permanent remedies. This is wasteful, too, in that it encourages costly litigation and resultant delays. As long as political appointees heading major agencies such as EPA are able to influence regulatory language, individual citizens must take an active role in even the semantics of legal terminology if they are to be treated fairly versus big buck legal departments and lobbying activities of profit-motivated, conscienceless, corporate citizens.

Change is needed in Superfund -- but it must be change that reflects what was intended in the first place: permanent remedies.

July 1-93

..... Juan Antonio

..... M.D.H.E.D.

..... P.O. Box 200901

..... Congress Blvd

..... Helena, MT 59620

..... Re: Pole Plant

..... Dear Juan

..... We want all contamination taken out
..... and destroyed. Option 5-B, Plus take it
..... from under the freeway at 10% more cost, is
..... the only way to protect the health and the
..... creek.

..... Thank you,
..... Mary Bruce
..... 941 California
..... Butte, MT 59701

RECEIVED

JUL 07 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

B. Robinson _____
W.J. Opitz WJO
Curt
Stwe
Smir

915 WEST GALENA ST.
BUTTE, MONTANA 59701
JUNE 18, 1993

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JUN 21 1993

MDHES
DIRECTOR'S OFFICE

MR. ROBERT ROBINSON
DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES
STATE OF MONTANA
HELENA, MONTANA 59620

DEAR MR. ROBINSON:

Enclosed are comments I would like for you to consider about the cleanup of the Montana Pole Superfund Site in Butte for which the DHES is the lead agency. I have sent these comments to Governor Marc Racicot.

Thank you,

John W. Ray

Dr. John W. Ray

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JUN 21 1993

Montana Department of Health
and Environmental Sciences
3000 N. 17th Avenue, Butte, MT 59717

MONTANA POLE PLANT SUPERFUND SITE

Submitted by John W. Ray, 915 West Galena St., Butte, Montana

The purpose of Superfund is to clean up hazardous waste sites which are a threat to human health and the environment. Remedies under Superfund should provide a permanent cleanup remedy not temporary containment or simply removal to another site. Simply cleanup is the "act of cleaning up" and the term clean means "pure, free from dirt, contamination, impurities." According to the EPA publication entitled Superfund: Environmental Progress the purpose of Superfund is to achieve "long-term cleanup goals for sites" and to remove "contamination from the environment." p. 1. The document further states that "the law directs EPA to protect public health by meeting strict cleanup standards at each site." and "Reduced to its environmental essence, the New Superfund mission is 'make sites safe, make sites clean, and bring new technology to bear on the problem.'" p. 3 In accordance with Superfund law, the selected remedy for the Montana Pole Site must, to the maximum extent possible, make the site free of contamination. The remedy should be a cleanup remedy. Any remedy short of this goal is not being faithful to Superfund.

The need for cleanup is particularly acute given the serious nature of the contamination at the site. The principal hazardous substances at the site, such as Dioxin, can cause cancer, birth defects, skin diseases, weaken the immune system, reproductive disorders, liver disease, and kidney disease. Dioxin is one of the most toxic substances known to man. The MDHES has correctly concluded that "there are excessive human health cancer risks and excessive noncancerous health hazards associated with hazardous substances at the site. Actual or threatened releases of hazardous substances from this site, . . . may present a current or potential threat to public health, welfare or the environment." (Proposed Plan: Montana Pole Superfund Site, May 1993, p. 6)

Unfortunately, past Superfund efforts have not met the goal of cleanup. The Office of Technology Assessment (OTA) has concluded that Superfund "remains largely ineffective and inefficient" and "is not working environmentally." OTA also has concluded that the Superfund program has too often settled for remedy technologies which would not reduce the "toxicity, mobility or volume" the hazardous waste. All too often Superfund has settled for remedies short of cleanup. Given the serious nature of the contaminants at the Montana Pole Site we cannot allow any remedy short of cleanup. We must insist that the site be made free of contamination. We must clean up the problem so that future generations don't have to deal with it.

If we are to meet the goal of actually cleaning up the Pole Plant Site it is obvious that only Alternatives 5 B, and C should be considered. Alternatives 1-4 would settle for less than cleanup and therefore should automatically be discarded. Only Alternatives 5 B and C really address the nine criteria for evaluating cleanup alternatives, particularly the two threshold criteria of protecting public health and the environment and compliance with applicable or relevant and appropriate requirements. Given available information only Alternative 5 B, the preferred alternative, fully meets the nine criteria particularly the two threshold criteria. Alternative 5 B would address all actual and potential sources of contamination with a view to cleaning up these sources. Alternative 5 B would offer maximum protection for public health and the environment, it most fully complies with applicable or relevant and appropriate requirements, it provides both short and long term effectiveness, it actually does clean up the site by reducing toxicity, volume, and mobility of the hazardous waste present, it is implementable, cost effective, has state agency acceptance, and would be most acceptable to the community.

I have deliberately left out alternative 5 A because it relies upon on-site incineration to clean up the site. Incineration has several severe negative consequences which call for its rejection as a suitable cleanup alternative.

Next, I would ask you to apply the test of critical scrutiny to any claims by PRPs that they can't clean up the site. Ask the simple question: Is their primary concern protecting the public health and the environment or is their primary concern protecting corporate profits? Doing little or nothing will obviously cost the PRPs less than cleaning up the site. Nevertheless, the mission of MDHES and EPA is not to protect corporate profits but to protect the public health and to protect the environment. If one looks at all nine alternative selection criteria, cost is only one and obviously secondary to coming up with a cleanup alternative which effectively cleans up the site.

TWO FINAL CONSIDERATIONS:

1. THE CONTAMINATION UNDER THE HIGHWAY MUST BE ADDRESSED. If cleanup is the goal, a possibly significant source of future contamination such as that under the highway must be addressed.

2. MORE ATTENTION MUST BE PAID TO INNOVATIVE TECHNOLOGIES, WHICH IS A SUPERFUND GOAL, FOR POLE PLANT CLEAN UP SUCH AS:

A. Use of ultraviolet light to speed up oxidation of toxic organic wastes particularly in combination with ozone and hydrogen peroxide.

Photochemical decomposition and photocatalytic oxidation detoxification process. See: Aero-Sun Times Winter/Spring 1989.

B. Vittrification (Assuming no incineration problems present), C. Use of advanced electric reactors. (Assuming no incineration problems present.),

D. Supercritical water, E Vacuum Extraction, and F. Ion exchange systems.

CC: GOVERNOR MARC RACICOT

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June 1, 1993

JUN 1 1993

To: Brian Antonioli, MDHES

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

JWR
From: John W. Ray-President, MEIC-915 West Galena St., Butte, MT 59701

Re: Comments on proposed Montana Pole Site Cleanup

It has come to my attention that there may have arisen some confusion as to my position at the public hearing on the proposed remedy for the Montana Pole Site. As stated in my written handout, I strongly support Alternative 5B as a comprehensive, practical plan which correctly has as its focus real and significant site cleanup. (Cleanup is defined as making the site free from contamination.) I urge you to reject ARCO's proposed Alternative 3 solution because it does not advocate any permanent cleanup of all sources and pathways of contamination at the site. Alternative 3 would leave a vast amount of contamination in place. Alternative 5B, which according to State experts (who have no "ax to grind") is feasible, addresses all sources of contamination with a view to providing permanent, maximum attainable cleanup.

I realize that it is very unlikely that the Montana Pole Site can ever be totally and completely cleaned up in the sense of being made 100% free of contamination. However, I would argue that under CERCLA and SARA the effort should be made to achieve maximum cleanup. Maximum cleanup is the focus of remedy 5B which is in itself a good remedy because it would achieve well over 90% cleanup in a cost effective manner. Of all the remedies proposed, Alternative 5B most closely meets the nine criteria for cleanup plan evaluation, particularly the two threshold criteria. Alternative 5B should be the remedy selected for the Montana Pole Site. Because Alternative 3, ARCO's preferred alternative, would provide "minimal reduction of toxicity, mobility and volume of contaminated site soil because a cap is employed" (Proposed Plan: Montana Pole Superfund Site), it should be rejected as a non-cleanup remedy.

I would also like to take this opportunity to congratulate both the State of Montana DHES and the Montana EPA for proposing a vigorous remedy for the Pole Plant problem. We are fortunate in Montana that our DHES Superfund program personnel and EPA Superfund personnel are committed to achieving the maximum protection of human health and the environment through significant site cleanup proposals.

June 15, 1993

Mr. Brian Antonioli
Montana Department of Health and Environmental Sciences
Solid and Hazardous Waste Bureau
Box 209091 Cogswell Building
Helena, MT 59601-9987

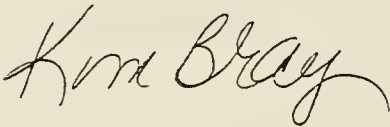
Dear Mr. Antonioli:

We are happy to send you the enclosed report, "How Toxic Is Tolerable? Montana Pole Treatment Plant Cleanup". We would like this report to be considered as part of the public comment process. This report was prepared for English 391: Business and Professional Writing at Montana College of Mineral Science and Technology.

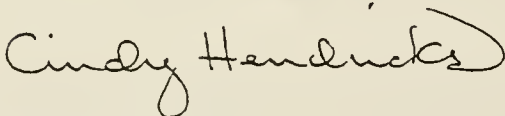
The report discusses the five proposed cleanup alternatives and then proposes an innovative alternative as the final recommendation. The recommended alternative is not one of the five alternatives which is now being considered. However, it should be researched before work begins as it is a comprehensive, viable alternative. The recommended alternative involves excavating to above the ground water table, allowing the ground water to freeze during the winter, and skimming the light non-aqueous phase liquid from the top of the frozen water. All alternatives are discussed in detail in the report.

We hope that you find our report a useful tool in determining cleanup methods at the Montana Pole Treatment Plant. If you have any questions, please call Cindy or me at (406) 496-4178.

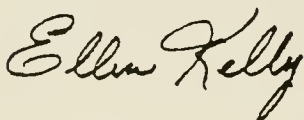
Sincerely,



Kim Bray



Cindy Hendricks



Ellen Kelly

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JUL 02 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

HOW TOXIC IS TOLERABLE?

MONTANA POLE AND TREATMENT PLANT CLEANUP ALTERNATIVES

by

Kim Bray
Cindy Hendricks
Ellen Kelly

Submitted to Dr. Joanne Cortese

English 391-01

Business and Professional Writing

Montana Tech

June 17, 1993

3. Protection of Silver Bow Creek: The Coalition adds its voice to that of the State in insisting maximum contaminant levels for drinking water be met on-site.
4. Future Site Use: By honoring historic (residential) use of the site, the State further provides for protection of the creek since this requires water quality standards be met on-site. We understand ARCO hopes to influence the Butte-Silver Bow government to change the pole plant zoning provision that presently allows residential use. Whether or not ARCO is successful, Superfund cleanup standards must not be driven by zoning provision changes that benefit Potentially Responsible Parties through lessened standards for cleanup. The State rightly chooses in its Proposed Plan not to allow Superfund to limit the rights of Butte citizens of hundreds of years from now: by excavating and treating maximum source material, future peoples will likely have an open-ended range of land use possibilities vs. a perpetual heritage of buried hazardous wastes.
5. Affected Public Entities: Water is not static; it is the medium by which contaminants from MPTP have been found "downstream past Rocker" according to Superfund internal file documents. Public comment has been solicited from Butte local government and from citizens residing near the site: cities and citizens downstream have not been approached with information or requests for their opinion of cleanup options. Trustees of the Rocker, Ramsey and Deer Lodge water districts and streamside landowners (especially those who rely on stream and well water for agricultural or domestic purposes) are impacted by MPTP decisions. These folks should be given an opportunity for input on cleanup standards and methods at the MPTP, especially regards their comfort level with the notion of a "reliable" pump-and-treat-in-perpetuity facility.

Migration of contaminants down Silver Bow Creek has occurred for decades. To what extent has DHES and EPA identified PCP's, PAH's, dioxin and furans in its stream, groundwater and sediment investigations throughout the Silver Bow Creek/Clark Fork River Superfund area? What, if any, are the food chain impacts from PCP's (especially), including local cattle and agricultural products? Do the DHES Streamside Tailings OU's tomographic and aerial characterizations of the stream and floodplain indicate where any oil from the pole plant may have collected? And if not already done, perhaps the State and EPA could look into whether or not significant contamination exists above the bedrock plate in the deep triangular soils zone between Silver Bow and Miles Crossing. If so, its potential for migration in a flood or seismic event may warrant analysis.

5. Permanence: The Coalition feels ARCO's preferred alternative, #3, does not meet the requirements of the

Superfund Amendments and Reauthorization Act provisions of the Comprehensive Environmental Response, Compensation and Liability Act. Because CERCLA prompted litigation involving questions of how clean is clean, Congress provided standards in SARA that emphasize its bias for "permanent" cleanup remedies. Land disposal was specifically addressed as a nonpermanent, disfavored treatment technique. To allow contaminants to remain in the ground in a dynamic groundwater locale is not logical under SARA, let alone to allow them to remain there for treatment in perpetuity.

Please refer to the attached research paper, "Permanent Remedies in Superfund" for a discussion of Congressional Intent in SARA. It is clear ARCO's multi-hundred year remedy does not qualify under the law.

We understand financial institutions are unable to provide information regarding interest rates beyond a 30 year period. This information might be considered a helpful indicator to EPA and DHES in determining the length of time operation and maintenance of cleanup facilities may be termed part of a "permanent" solution.

ARCO's option, alternative #3, relies on a man-made, nuts, bolts and friction-plagued pump-and-treat facility "in perpetuity," "...for hundreds and hundreds of years," "...for an indefinite" period of time. Importantly, such a facility is also reliant on stable national and local economies to assure any funds provided for operation remain available for such purpose, again, in perpetuity. In comparison, the history of the U.S. economy, 200 years, is short. It's major depression, recessions, current national debt, and unknown future effects from pending free trade agreements, etc., would indicate that attempts to fund a perpetual treatment facility may be a very risky challenge to permanence and, therefore, an unacceptable course.

Such a perpetual facility is reliant, also, on likeminded priorities in the year 2500 or 3000, etc. as today from local, state and federal government entities and citizens of Butte. It assumes all will be here and will not have encountered crises that may have caused them to reallocate any trust funds away from MFTP cleanup.

ARCO proposes the pump-and-treat facility at MFTP should run as long as necessary to rid the area of contaminants and acknowledges this will be many hundreds of years at a minimum. Neither ARCO, the United States nor the city of Butte have existed that long. Is it not presumptuous and unfair to force future residents of the area to assume burdens of today's corporate responsible party? Has careful consideration been given to the extent to which future crises or politics may influence the permanence of today's decisions?

In ARCO's "Position on the Montana Pole Plant Cleanup Proposal" handout from the public hearing on May 25, 1993, they propose that after (minor cleanup) excavating and treating what amounts to less than 7% of the "accessible" contamination, they would cap the site. Then, their public literature reads, "The entire area could be planted with grass, trees and shrubs" ... "The surface of this site will be clean, and the contaminants will remain stable below the cap." The groundwater table at the site is known to rise and fall seasonally in a range of two feet, so it is obvious there is a great deal of water movement beneath the site. Therefore, ARCO's statement that there can be stability of contaminants under these circumstances is misleading. And for contaminants to remain below the cap is not a permanent solution.

ARCO's public handout goes on to offer additional aesthetics in lieu of permanence: "Instead of viewing the site as a future residential development, this more practical response encourages the development of a usable park. Creating an attractive park to connect the Pole Plant site with the future Colorado Tailings greenbelt area is entirely feasible under the ARCO preferred plan" ... and "would provide the community with an attractive recreational area, with walking trails and possibly picnic areas." To imply or make an offer to provide grass, trees, shrubs and a park-like setting if their preferred remedy is chosen, is unfair to the citizens of Butte and especially to those downstream who may be adversely impacted by contamination from the site. In asking the Butte-Silver Bow government to endorse its cleanup plan, ARCO attempts, as well, to put local officials in a difficult position, given the extreme economic problems mine closure, mining contamination "moonscapes" and Superfund site designation have brought to the community. The Coalition is pleased the Butte-Silver Bow County Commissioners did not endorse ARCO's preferred alternative despite grave need for reclamation and community enhancement programs such as described by ARCO.

6. Costs: It is curious that ARCO prefers an alternative that is less expensive for the first 30 years than the State's preferred alternative (which, having solved the problem, may be unnecessary after 30 years). Yet, ARCO acknowledges their remedy must be maintained "in perpetuity" -- a period for which costs aren't known or discussed. If impermanent alternatives must be listed, the Coalition urges the State and EPA to provide the public with some indication of the reality of their costs. Perhaps a 200 year cost, 500, 1,000 etc. might be shown. With only the 30 year cost data for all remedies, regardless of the time they take to remediate contaminants, as presented in the "Proposed Plan" document, it is easy for the public to become confused.

In conclusion, the Coalition feels it is incumbent on those

involved to assure present and future generations are not forced to deal with the MPTP site contamination for hundreds and hundreds of years. We believe only a very definitely permanent solution will effectively protect human health and the environment. To attempt anything less than excavation and treatment of all source areas would send a message that degradation of water in Montana is acceptable and would set a Superfund precedent of not meeting water quality standards throughout the Clark Fork watershed, from the Berkeley Pit to Milltown.

We greatly appreciate the care and resourcefulness of State of Montana and EPA personnel in development of their preferred remedy and options for this very complex site.

Yours very truly,

Mary Kay Craig
Upper River Field Representative, Butte

cc: C. B. Pearson, Missoula

☆

"PERMANENT" REMEDIES

IN SUPERFUND

A Review of CERCLA, SARA and the National Contingency Plan

Vs. Congressional Intent

With Examples of Application at

The Nation's Largest Superfund Site

Mary Kay Craig
Environmental Law
Montana Tech
March 31, 1993
Rev. June 22, 1993

A dichotomy exists between Congressional intent and application of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) through the Reagan administration's 1990 National Contingency Plan (NCP) and Title 40 Code of Federal Regulations as pertains to "permanent" kinds of remedies. In-field application of the NCP in at least the largest national Superfund site -- the 100-plus miles of contaminated streams and floodplain from the headwaters of Montana's Clark Fork River in Butte to Milltown Dam near Missoula -- bears witness to the need to return to the Act and to Congressional intent to rework EPA's rulemaking with a less industry-biased interpretation of the law.

CERCLA was first enacted in 1980 (United States Code as Title 42, Chapter 103, Sections 9601 through 9675) so that past uncontrolled releases of hazardous substances to the environment might be effectively dealt with by the federal government. It was to be financed by a tax on industries most associated with those substances to create a "super" fund, thereby deemphasizing cost as an impediment to cleanups. Unfortunately, the law said little to guide EPA in what cleanup standards should be applied. Section 104(c)(4) required selection of remedial actions in accordance with the National Contingency Plan "to the extent practicable," emphasizing cost-effectiveness that balances the protection of public health and available funds.

Lack of direction in the law caused much debate on "how clean is clean;" e.g., should contaminated water be treated to strict state standards, less stringent federal standards, or be handled on a case-by-case basis? Similar confusion existed with regard to selection of remedial plans. Evaluation of the "cost-effectiveness" of each was subject to various law suit provoking points-of-view. Section 105(7) of CERCLA directed the NCP to provide "means of assuring that remedial action measures are cost-effective over the period of potential exposure to the hazardous substances or contaminated materials." But the NCP merely responded that "other ... Federal laws ... will generally guide EPA in determining the appropriate "level of cleanup at CERCLA sites" (50 Fed.Reg. 47917 (1985); 40 CFR 300.68 (1986)).

Congress was not satisfied. In reauthorizing the Resource Conservation and Recovery Act, it called for a "land ban" on disposal of liquid hazardous waste (42 U.S.C. 6924(d)(1), (g)(5); 51 Fed.Reg. 40572 Nov. 7, 1986). Concurrently, hearings before the Subcommittee on Commerce, Transportation and Tourism of the House Committee on Energy and Commerce on Reauthorization of Superfund (99th Congress, 1st Session, 1985), disclosed transfer of wastes from Superfund sites to leaking RCRA disposal sites. Concerned that CERCLA waste was being moved from one site to another where it might trigger future Superfund work, Congress called for more "permanent" treatment of Superfund waste and less land disposal of waste from Superfund sites.

On October 17, 1986, CERCLA was amended by passage of the Superfund Amendments and Reauthorization Act of 1986 (SARA) (10/17/86 Pub.L 99-499, Stat 1613 et seq.). It increased EPA's response authority and funding, set a cleanup schedule, specified cleanup standards, encouraged settlements between EPA and responsible parties to make the fund stretch further, authorized EPA to issue NCP revisions, and it also expressed Congress' bias in favor of "permanent" treatment.

Under fire for inaction due to legal gridlock, EPA in 1990 wrote a self-management document and then incorporated it into their National Contingency Plan of 1990 (55 Fed.Reg. 8666, 3/8/90). Because the 1990 NCP revisions were so extensive, EPA recodified them with hazardous substance response in 40 CFR Subpart E, Part 300. The key provisions dealing with remedy selection in Subpart E are at 40 CFR 300.430. In revising NCP, EPA noted its "combination of mandates" create "dynamic tensions" in remedy selection policies (53 Fed.Reg. 51422, 12/21/88). In fact, the Contingency Plan addresses specific problems EPA had encountered from PRPs and provides (biased) guidelines for "how clean is clean." Substantive use of the word "permanent" is rare in the NCP.

A CERCLA response under NCP involves seven areas of activity: discovery and notification, assessment, removals, site evaluation, community relations and remedial action. The sixth, remedial action, includes a system for evaluating the "trade offs" among the various remedial options based on nine criteria in three categories. "Threshold criteria" or absolute requirements is the first category and it includes 1) that the remedy protect human health and the environment, and 2) that it comply with ARARs. The second category of criteria are termed "primary balancing" requirements, including: 3) long term effectiveness and permanence; 4) reduction of toxicity, mobility or volume through treatment; 5) short term effectiveness; 6) implementability; and 7) cost. The third category of "modifying criteria" includes 8) State acceptance and 9) community acceptance.

Note that "permanence" is hidden behind the term, "long term effectiveness" in item #3. And one soon learns that even though permanence comes before cost in category two, the order in which they are listed means nothing; in practice they are given equal weight as balancing criteria. The real kicker is that in Reagan-Bush-era EPA, all nine criteria are subject to an over-all umbrella "cost effectiveness" evaluation, allowing "cost" more than a double role in selection of remedy. Where, oh where did the "preference for permanence" go?

Under the big-business-favoring Reagan-Bush Administrations, EPA has promulgated rules that allow for "trade offs" in category two. Permanence is being traded off against cost in defiance of

the intent of Congress. Thickness of the NCP document helps assure obfuscation of this fact, eliminating much opposition. Cost is said to only be used to distinguish among alternatives that fit the threshold requirements, but in so doing, "permanence" becomes relegated to the same weakened ranking as "short-term effectiveness," etc.

Permanence was favored by Congress. First, in Section 104(a)(2) of SARA, Congress indicates its distain for non-permanent solutions by short-circuiting temporary remedies of moving wastes from one Superfund site to another. It requires short-term emergency actions mesh with long-term solutions in order to avoid "wasteful, repetitive, short-term removal actions that do not contribute to the efficient, cost-effective, performance of long-term remedial actions."

Next, a cursory glance at CERCLA's new SARA provision, Section 121, "Cleanup Standards," reveals that "permanent" or "permanently" appears four times on the same page, within the first three paragraphs (100 STAT. 1672). The word, permanent, is assiduously avoided by the Butte-area Superfund site's major responsible party. ARCO refers instead to "long term effectiveness," a term which appears only once in the same three paragraphs.

Closer scrutiny of the context in which these terms are used clearly indicates Congress was not interested in half-measures or partial solutions:--Section 121(b)(1) of SARA provides the first general rule, "Remedial actions in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances, pollutants and contaminants as a principal element, are to be preferred," and "the President shall conduct an assessment of permanent solutions and alternative treatment technologies or resource recovery technologies that, in whole or in part, will result in a permanent and significant decrease in the toxicity, mobility or volume of the hazardous substance, pollutant or contaminant." In making such assessment, (he) shall specifically address the long-term effectiveness of various alternatives." The rules go on to delineate seven factors to be taken into account in the assessment, then conclude, "the President shall select a remedial action that is protective of human health and the environment, that is cost effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable."

"Responsible parties" often point out that SARA did not define "permanent." They've been known to say that "long-term effectiveness" means the same thing. Webster's Third New International Dictionary defines "permanent" as: "1) continuing or enduring (as in the same state, status, place) without fundamental or marked change: not subject to fluctuation or

alternation: fixed or intended to be fixed: LASTING; STABLE. 2) ...something conceived of as abiding or eternal." "Long term" on the other hand, is less definite by definition: "extending over or involving a relatively long period of time." Logically, if something is not permanent, it is impermanent. "Impermanent" is defined as "not permanent: not lasting: transient: unstable: soon destroyed." EPA is seriously considering in situ lime treatment of toxic mine tailings along streamsides of Silver Bow Creek and the Clark Fork River. Lime treatment is an old remedy with decades of mitigation history in and around still-dead Silver Bow Creek. It can raise the acidic pH of mine tailings, and it causes heavy metal aquatic-life toxins, copper and zinc, to drop to a sludge at the bottom of a stream. It is not "permanent." "Long term" with luck, its great "impermanence" will be clear with the first unpredictably large runoff of snowmelt, once again killing off fish and other riparian life from Butte to Missoula. Toxins in a flood plain can never be considered static, stable, fixed.

In SARA, one of the seven assessment factors to be considered for remedial alternatives is the "long term uncertainties associated with land disposal." CERCLA language grew from needs based in organic chemical wastes, and only later came to apply to toxic mine wastes. Certainly, a "reasonable man" in law would expect Congress to prefer as permanent, land disposal of fish-killing toxic mine tailings on a high, dry, runoff controlled bench vs. the current repository in the floodplain and streambed of the headwaters of Montana's largest river, a stream now dead from proximity to those minerals. Nevertheless, in implementing SARA, EPA (40 CFR, 300.430(f)(1)(ii)(E)) rules that an alternative that relies on the off-site transport and land disposal of untreated hazardous substances will be the least favored alternative where practicable treatment technologies are available.

CERCLA's 1980 "cost-effectiveness" requirement forced EPA to study cost/benefits of all potential remedies no matter what level of cleanup they could achieve. SARA gave better direction. In the very first sentence of the new provision of 1986 (Section 121(a)), Congress says remedies should be selected "that are in accordance with this section and, to the extent practicable, the National Contingency Plan and which provide for cost-effective response." Clearly, in saying up-front, at the outset, "to the extent practicable" in reference to the National Contingency Plan and cost-effectiveness, Congress intended to subjugate them to the requirements of the section in which the word, "permanent" plays such an undeniably prominent role.

Instead, the Reagan-Bush-era NCP focuses on cost-effectiveness. Time and again in the NCP Final Rule of Feb. 2, 1990, EPA presents pro and con comments received on the proposed rules related to permanence, long-term effectiveness and cost,

only to "drop the ball" in acknowledging permanence. In Section 300.430(a)(9), "Detailed Analysis of Alternatives," Line 8, pg. 150 of that document reads, "EPA evaluates permanence to the maximum extent practicable as the degree of long-term effectiveness and permanence afforded by a remedy. This is judged along a continuum, with remedies offering greater or lesser degrees of long-term effectiveness and permanence." EPA consistently lumps "permanence" with "long term effectiveness", something Congress did not do. In defining permanence by use of the word, permanent, and then endowing it with greater or lesser degrees of itself, EPA ignores Webster's "fixed," "abiding," "continuing," "enduring," and "stable" non-ending attributes of the word, and common parlance as well! In Section 300.430, "RI/FS Study and Selection of Remedy," page 107, NCP reads "one group of commenters believes EPA should establish a remedy selection process that adopts as its goal full site restoration and treatment of all material to the extent technically feasible ... (and) limit consideration of cost to the selection of the less expensive of comparably effective treatment technologies." Other commenters here said Superfund "should seek to achieve protection primarily by controlling exposure to current risks through use of engineering and institutional controls," with treatment used only if other controls lack reliability or if the treatment can be done "without a significant increase in cost." In reply EPA said it "sets a course between the two ends of the spectrum reflected in these comments," and then states its goal in a simplistic reiteration of language from SARA: "remedial actions that protect human health and the environment, that maintain protection over time, and that minimize untreated waste." This is pap. It does not diligently address the comments, and is typical of responses throughout the document.

In Section 121(d)(1) "Degree of Cleanup," Congress employed the term, "at a minimum" regarding the need to protect human health and the environment. Dubious protection is afforded by a remedy that merely subjects to the whims of nature toxic metals that are impermanently "frozen" next to the type of life they threaten. EPA has given little heed to date to the fact that lime treatment of heavy metals frees and makes more available in groundwater the human-carcinogenic lightweight metal, Arsenic-5. And lime treatment's impermanence is also challenged by tiny diatom algae. Despite the multimillion dollar lime treatment facility built between dead Silver Bow Creek and the Clark Fork River, these algae are believed to lift and carry over the dam toxic copper and zinc from the bottom of the Warm Springs Ponds, continuing the fatal threat to aquatic life that results in massive fish kills or low numbers of fish and absence of native wild fish.

In 121(d)(2)(a)(ii), Congress uses the term, "at least," twice in the same sentence to underscore need for selected remedies to meet Applicable Relevant and Appropriate Requirements (any other

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Graph 1: MPTP Costs Benefit Comparison,

June 1993 13a

ABSTRACT

The Montana Pole and Treatment Plant Superfund site requires extensive cleanup. Cleanup solutions must include innovative, but implementable, technological approaches.

Currently, five remedies are under consideration. However, as the following report suggests, other options should be considered before selecting a final cleanup alternative.

INTRODUCTION

Background

In 1980, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly referred to as Superfund. CERCLA's basic purposes are to provide funding and enforcement authority for cleaning up past uncontrolled waste disposal sites in the United States. Congress designated the United States Environmental Protection Agency (EPA) as the Federal Agency responsible for the long-term cleanup and oversight of these waste disposal sites. Congress also authorized the EPA to identify, whenever possible, all potentially responsible parties (PRPs) who can perform and pay for the investigation and cleanup of the contaminated sites. CERCLA was amended and reauthorized in 1986 by the Superfund Amendments and Reauthorization Act (SARA).

EPA's primary regulation enforcing CERCLA, as amended, is the National Oil and Hazardous Substances Contingency Plan (NCP). The EPA has developed guidelines to implement CERCLA and the NCP.

Before the EPA classifies a past disposal site as a Superfund site, it does a preliminary assessment and site inspection. The EPA then uses the information gathered to rank the site using a mathematical scheme called the Hazardous Ranking System. Hazardous

waste sites having the highest potential for affecting human health, welfare and the environment receive the highest ranking and are listed on the National Priorities List (NPL) for hazardous waste cleanup.

The Montana Pole and Treatment Plant (MPTP), a former wood treating facility in Butte, was added to the NPL in 1986 (MDHES ...Community Relations Plan 3). Hazardous conditions at the plant have since been investigated and evaluated for human and environmental health risk. Studies were done to determine possible cleanup solutions at the site. Five alternatives for a final cleanup solution are currently under consideration by EPA and the Montana Department of Health and Environmental Sciences (MDHES). The EPA and MDHES have requested comments from the community before deciding on a final cleanup solution at the MPTP site. This public comment period ends July 7, 1993.

Problem

The MPTP site requires extensive cleanup. Five cleanup alternatives involving a variety of technologies are being considered. The MDHES and EPA endorse one of the five alternative solutions as the preferred remedy. Atlantic Richfield Company (ARCO) strongly disagrees with the MDHES/EPA plan and offers a different solution. ARCO, and other parties, are potentially liable for the cost of the cleanup.

Purpose of Report

The purpose of this report is to explain the nature and the extent of the contamination at the MPTP site, cleanup measures already accomplished, and the cleanup alternatives.

Scope

This report considers the merits and flaws of each of the five alternatives presented for public comment. It also suggests a sixth alternative for MDHES and EPA consideration.

DISCUSSION

History and location of the Montana Pole and Treatment Plant

Montana Pole and Treatment Plant was a family-owned business that treated posts, poles, timbers, and ties with wood preservatives. The woodtreating facility operated from 1947 to 1984. During these years, a mixture of pentachlorophenol (PCP) and diesel, commonly known as penta-oil was the primary wood preservative used (MDHES Proposed Plan 3).

The former wood treatment facility is located on the western edge of Butte, just south of Silver Bow Creek and a quarter mile west of the Boulevard neighborhood (Appendix Map

3-1). Interstate 15/90 runs across the ten acre site in an east-west direction and partitions the site into a northern section and a southern section (MDHES Proposed Plan 4).

The family that owned the Pole Plant leased the property from the Anaconda Minerals Company (AMC) from 1946 to 1955. In 1955 AMC sold the property to the plant owners (MDHES ...Community Relations Plan 7).

Superfund Activity at the Site

In 1983, a Butte area citizen complained about oil seeping into Silver Bow Creek. MDHES investigated the complaint and discovered high levels of PCP, a hazardous waste substance, discharging into the creek from the MPTP, which is located approximately 200 yards away from the creek (MDHES Community Relations Plan 7). In compliance with CERCLA/SARA, MDHES officials notified EPA of the PCP discharge.

MDHES and EPA conducted a preliminary assessment and site inspections (PA/SI) from 1984 to 1985. The PA/SI confirmed the presence of PCP, polycyclic aromatic hydrocarbons (PAHs), and dioxin/furans at the site. The contamination was found in the soils and in the groundwater (MDHES ...Community Relations Plan 5). As a result of the findings, EPA added MPTP to the NPL on July 22, 1987 (MDHES Proposed Plan 4).

In 1985, the EPA Emergency Response Branch began conducting a removal action on the site to alleviate discharge into Silver Bow Creek and to stabilize the site. Emergency removal actions "... included installation of a groundwater interception and oil recovery system. EPA also excavated contaminated soils and equipment and placed these in storage sheds on the site" (MDHES Progress... May 1989 2).

In 1988, MDHES and EPA signed a cooperative agreement giving MDHES the lead management responsibility at the MPTP site. MDHES, in 1989, received funding from EPA to negotiate an agreement with the PRPs to investigate the extent of contamination at the site and pursue potential treatment technologies that could be used to clean up the site (Appendix Maps 3-2 and 3-3).

ARCO was named by MDHES as one of the primary PRPs for the contamination at the site. ARCO is the successor-in-interest to AMC, which owned the MPTP property until 1955. Also named as PRPs are Montana Pole and Treating Plant, Mr. Torger Oaas, the plant owner, and Burlington Northern Railroad which provided rail service to the plant (Montana Standard October 25, 1991).

MDHES and ARCO signed an Administrative Order on Consent in April 1990, under which ARCO agreed to conduct a remedial investigation and feasibility study (RI/FS) (MDHES Proposed Plan 4). The RI/FS is a two-part study to determine the nature and extent of contamination and ways to solve the problems created by the contamination.

During the RI, scientists identify the types, locations, and amounts of contamination and the risks they may present to human health and the environment. During the FS, scientists and engineers develop, screen, and evaluate ways to clean up the contamination. The RI/FS at MPTP was completed by ARCO in 1992.

As part of the RI/FS, MDHES and EPA completed a risk assessment to identify existing and potential health risks to both human health and the environment at the site. The RI revealed high concentrations of PCP in the soil, a distinct plume of wood-treating oils floating at the top of the water table over a large area that extends into Silver Bow Creek and farther downstream. Large quantities of PAHs and dioxin/furans are also present. PCP and dioxin are known carcinogens.

EPA took further action at MPTP as a result of the RI. The action included the installation of an 890-foot rubber sheet piling wall to a depth of 15 feet between the plant and the creek, which allows relatively clean groundwater to flow into the creek but restrains the oil floating on top of the groundwater. Along with the installation of ten recovery wells designed to collect only free-floating oil and pump it to an on-site storage tank (Appendix Maps 3-4) (MDHES Proposed Plan 4 and Hendricks). A groundwater treatment plant was also built which utilizes carbon filters to remove contaminants that are dissolved in groundwater. Clean water is then released to Silver Bow Creek from the plant's discharge pipe (Hendricks).

MDHES and EPA developed five alternatives for the MPTP, using data from the RI/FS. MDHES presented the alternatives in a public meeting held May 25, 1993 at the Butte Community Center. EPA, ARCO, and their legal representatives also attended this meeting along with concerned members of the community.

PROPOSED ALTERNATIVES

Alternative 1: No Action

Under Alternative 1, no further actions would be taken at the site. Contamination would be left on site and would continue to migrate and impact groundwater and Silver Bow Creek. The costs associated with Alternative 1 include maintaining the operation of the existing groundwater containment treatment system for a period of 30 years. The maintenance, however, would continue indefinitely beyond 30 years and so would the cost.

Estimated present worth cost: \$2,310,000 to \$2,350,000

Implementation time: Not applicable

Alternative 1 is presented for comparison purposes only; it is not a viable remedy (MDHES Proposed Plan 7).

Alternative 2: Additional Institutional Controls and Groundwater Monitoring

Alternative 2 calls for implementing controls such as zoning and building restrictions to attempt to limit human exposure to the contaminants. The groundwater treating system would continue to operate but all contaminations would be left at the site and continue to impact groundwater and Silver Bow Creek. In addition, it would include monitoring of downgradient (the groundwater equivalent of downstream) and vertical migration of dissolved groundwater contamination, Light Non-Aqueous Phase Liquid (LNAPL) (MDHES Proposed Plan 8). The costs for Alternative 2 are for maintaining operation of the existing groundwater containment and treating system. The estimated costs assume action would continue for 30 years but, because the contamination would be left on site, actual costs would be incurred indefinitely beyond 30 years.

Estimated present worth cost: \$3,270,000 to \$4,400,000

Implementation time: 1 year

Laws and fences cannot prevent human exposure to the contamination at the MPTP. Alternative 2 is not an acceptable alternative because it does not remove the threat to human health.

Alternative 3: Soil Capping and Groundwater Containment and Treatment

This alternative is comprised of three subalternatives: 3A, 3B, and 3C. The subalternatives differ in the manner used to treat the soils and in the method of incineration. For instance, Alternative 3A would cap an area the size of three football fields and require limited amounts of on-site incineration. This would prevent human

contact and reduce infiltration of precipitation through the contaminated soils. Other soil actions which would be necessary under Alternative 3A include filling excavated areas using treated soils, surface grading and revegetation.

Alternatives 3B and 3C are the same as Alternative 3A except that Alternative 3B soils would be treated using biological land treatment and all oils and sludges would be incinerated off-site. Alternative 3C would treat the soils by soil washing. The residual fine soils from this process that do not meet cleanup criteria would be sent to a bioslurry reactor. Oils and sludges would also be incinerated off-site (MDHES Proposed Plan 10-11).

Alternative 3A:

- Surface capping of contaminated soils;
- Treatment of previously removed soils and a limited amount of excavated soils using on-site incineration;
- Containment and treatment of groundwater and LNAPL;
- Treatment of oily wastes, sludges, equipment and debris;
and
- Groundwater monitoring and institutional controls

Estimated present worth cost: \$34,620,000 to \$60,130,000

Implementation time: 2 years - soils

30 years - groundwater (MDHES Proposed Plan 8)

Under this alternative, oils and sludges currently in place at the site would be incinerated on-site along with soils. After this process, contaminated debris and equipment would be decontaminated and disposed of in a licensed off-site landfill.

A groundwater containment and treatment system would be constructed to contain the LNAPL and dissolved groundwater contaminant plumes and capture the contamination before it discharges into Silver Bow Creek. Utilizing this system would include an extensive network of extraction and containment mechanisms (trenches, extraction wells, physical/hydraulic barriers) (MDHES Proposed Plan 8).

Treatment of contaminated groundwater would occur to the degree necessary to meet applicable environmental standards and health-based criteria prior to discharge. Additionally, an in-situ (in-place) bioremediation process would be implemented to assist in long-term cleanup of groundwater and subsurface soils.

Groundwater would be monitored to evaluate the effectiveness of the recovery and treatment system. The institutional controls, operations, and maintenance of the cap

along with the groundwater treatment system would be incurred indefinitely beyond the 30 year period.

Alternative 3B (preferred alternative of ARCO (Stash))

- Surface capping;
- Treatment of previously removed soils and a limited amount of excavated soils using biological land treatment;
- Containment and treatment of groundwater and LNAPL;
- Treatment of oily wastes, sludges, equipment and debris;
- Groundwater monitoring and institutional controls

Estimated present worth cost: \$21,060,000 to \$36,640,000

Implementation time: 3 years - soils

30 years - groundwater (MDHES Proposed Plan 8)

Alternative 3B is the same as Alternative 3A except that soils would be treated using biological land treatment and all oils and sludges would be incinerated off-site.

Alternative 3C:

- Surface capping;
- Treatment of previously removed soils and a limited amount of excavated soils using soil washing;
- Containment and treatment of groundwater and LNAPL;
- Treatment of oily wastes, sludges, equipment and debris;
and
- Groundwater monitoring and institutional controls

Estimated present worth cost: \$27,720,000 to \$43,780,000

Implementation time: 2 years - soils

30 years - groundwater (MDHES Proposed Plan 9)

Alternative 3C is the same as Alternative 3A except that soils would be treated using soil washing and all oils and sludges would be incinerated off-site. Residual fine soils from the soil washing process which do not meet cleanup criteria would be further treated in a bioslurry reactor.

Alternative 4: Partial Excavation and Treatment of Soils and Groundwater Containment and Treatment

This alternative is comprised of three subalternatives: 4A, 4B, and 4C. The subalternatives differ in the manner used to treat the soils and in the method of incineration. This alternative is the same as Alternative 5 except that excavation is limited to partial excavation of soils which reduces costs compared to Alternative 5 which utilizes total excavation at a higher cost (Graph 1). Due to the similarities, Alternative 5 will be presented in more detail because it is a more comprehensive solution complying with the definition of Superfund.

Alternative 5: Total Excavation and Treatment of Soils and Groundwater Containment and Treatment

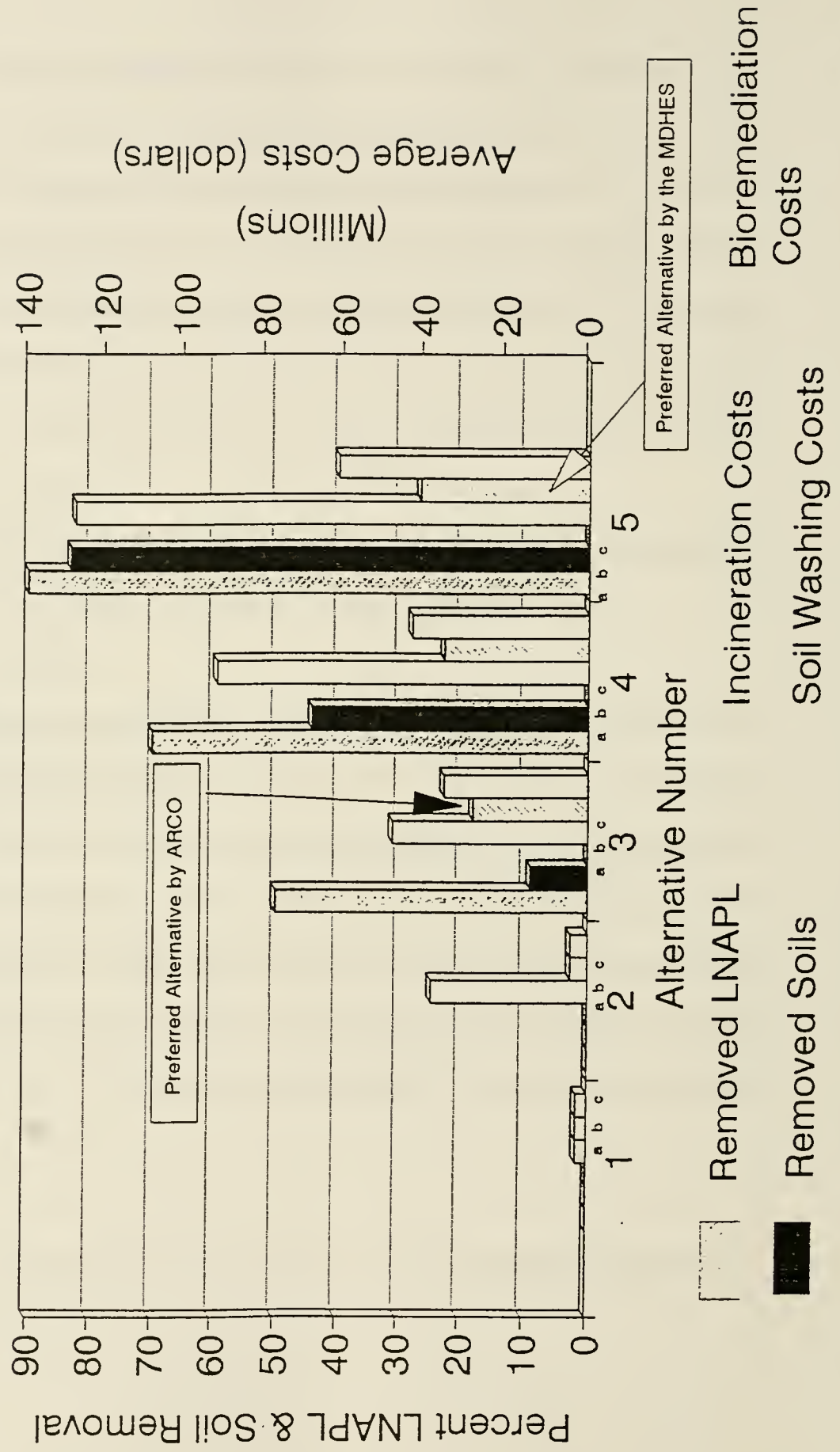
This alternative is comprised of three subalternatives: 5A, 5B, and 5C. The subalternatives differ in the manner used to treat the soils and in the method of incineration. For instance, Alternative 5A utilizes an on-site incinerator which is the most effective treatment method, however, it may not be acceptable to the local community. Alternatives 5B and 5C utilize an off-site incinerator which may also present a problem because off-site incinerator operators are reluctant to accept wastes containing dioxin which is present at the MPTP (MDHES Proposed Plan 10).

Alternative 5A:

MPTP Costs Benefit Comparison

Alternative vs LNAPL, Soils & Costs

All Values are from the MDHES



- Excavation of all accessible contaminated soils and treatment using on-site incineration;
- Treatment of previously removed soils using on-site incineration;
- Containment and treatment of groundwater and LNAPL;
- Treatment of oily wastes, sludges, equipment and debris; and
- Groundwater monitoring and institutional controls

Estimated present worth cost \$ 99,870,000 to \$ 156,220,000

Implementation time: 8 years - soils

30 years - groundwater (MDHES Proposed Plan 10)

Under Alternative 5A, all accessible site soils would be excavated and treated in an on-site incinerator (MDHES Proposed Plan 10). The areas of soil excavation would include surface soil hot spots, the former plant process area, the drainage ditch, and the soil areas near the groundwater table which have been contaminated. Approximately 10,000 cubic yards of the highly contaminated soils that were excavated and bagged by the EPA in 1985 would be included in this process.

The total volume of soil to be excavated is estimated at 279,000 cubic yards, not all of which is contaminated. It is necessary to excavate 94,000 cubic yards of uncontaminated soils before reaching the soils that have been contaminated with LNAPL. It is estimated that 195,000 cubic yards of soil would be treated, including the bagged soil.

In some instances, it is not possible to excavate contaminated soils due to its location. Approximately 44,000 cubic yards of contaminated soils located under the interstate must be treated in-place through LNAPL extraction, water flushing and in-situ bioremediation (MDHES Proposed Plan 10).

Under this Alternative, 5A, oils and sludges currently in place at the site would be incinerated on-site along with the soils (MDHES Proposed Plan 10). After the excavated soils have been treated, they would be used to backfill the previously excavated areas.

A system would be constructed for containment and treatment of groundwater and LNAPL. This system would capture contamination before it reaches Silver Bow Creek. Groundwater treatment above ground would be handled through a variety of treatments as deemed necessary.

It is entirely possible that groundwater treatment would be necessary beyond the 30 year time frame. This could significantly alter the estimated cost.

All contaminated equipment and debris would be disposed in a licensed off-site landfill. In addition, institutional controls must be implemented as needed to prevent human access to the area until the remedial action is completed.

Finally, groundwater monitoring would be implemented to evaluate the movement of contaminants and ensure compliance with remedial action requirements.

Alternative 5B (MDHES and EPA preferred alternative (Antonioli))

- Excavation of all accessible contaminated soils and treatment using biological land treatment;
- Treatment of previously removed soils using biological land treatment;
- Containment and treatment of groundwater and LNAPL;
- Treatment of oily wastes, sludges, equipment and debris;
and
- Groundwater monitoring and institutional controls

Estimated present worth cost: \$ 27,530,000 to \$ 55,200,000

Implementation time: 11 years - soils

30 years - groundwater (MDHES Proposed Plan 11)

Alternative 5B is the same as Alternative 5A except that soils would be treated using biological land treatment and all oils and sludges would be treated off-site (MDHES Proposed Plan 11). Biological land treatment is inferior to incineration, but would provide an acceptable level of containment at a significantly reduced cost. However, it would take three years longer than Alternative 5A for implementation of the soil remediation.

Alternative 5C:

- Excavation of all accessible contaminated soils and treatment using soil washing;
- Treatment of previously removed soils using soil washing;
- Containment and treatment of groundwater and LNAPL;
- Treatment of oily wastes, sludges, equipment and debris; and
- Groundwater monitoring and institutional controls

Estimated present worth cost: \$ 48,080,000 to \$ 78,180,000

Implementation time: 4 years - soils

30 years - groundwater (MDHES Proposed Plan 11)

Alternative 5C is identical to 5A except that soils would be treated using soil washing and all oils and sludges would be incinerated off-site (MDHES Proposed Plan 11). As with Alternative 5B, this method of cleanup is inferior to that of incineration, but would provide an acceptable level of containment at a significantly reduced cost. The time of implementation for soils is also decreased by four years as compared to Alternative 5A.

Alternatives 5A, 5B, and 5C are not without flaws. On page 36 of ARCO's position paper of April 8, 1993, ARCO maintains that there may be extensive problems encountered during the excavation process below the water table unless the site is first dewatered. Dewatering is not possible due to the floating LNAPL layer and the desire to minimize the

smear zone (Rowling). If the site is not dewatered, the movement of heavy equipment may push contaminated groundwater deeper into the aquifer beneath the base of the excavation. In fact, heavy equipment movement at depths four feet below the water table may not even be possible.

A discrepancy in cost exists between the MDHES and ARCO. The MDHES provided a minimum excavation cost figure of \$17.00 per cubic yard, while ARCO maintains that the figure would range from \$40.00 to \$75.00 per cubic yard.

RECOMMENDATIONS

Additional remedies should be investigated as viable technological alternatives such as super critical water ion exchange, solar ultraviolet light, photochemical process, electric reactors, reverse hydraulic mining suction, and in-situ soil vitrification. The following alternative is submitted for investigation.

Recommended Alternative 6: Total Excavation and Groundwater Freezing to Skim
LNAPL Product without further Groundwater Contamination.

This alternative, a subset of preferred Alternative 5B, is developed and presented by the writers. It is a viable alternative and necessitates investigation prior to selecting a solution.

- Excavation of all accessible contaminated soils down to 24 inches above the groundwater table and treatment using biological land treatment;
- Treatment of previously removed soils using biological land treatment;
- Impregnate contaminated groundwater with liquid nitrogen to supplement natural freezing;
- Once frozen, excavate remaining 24 inches to expose LNAPL and smear zone;
- Containment and treatment of LNAPL;
- Treatment of oily wastes, sludges, equipment and debris; and
- Groundwater monitoring and institutional controls

Estimated cost is undetermined.

Implementation time: Estimated 8 years - soils

Estimated 20-30 years - groundwater

Alternative 6 is identical to Alternative 5B except that preliminary or surface excavation is reduced to 24 inches above the groundwater table and groundwater freezing is introduced to allow LNAPL skimming from the frozen groundwater. Limiting surface excavation to above the groundwater table before freezing reduces the risk of further contamination from mixing the LNAPL with the groundwater by the excavation equipment.

Implementing excavation during winter would ensure stabilization of soils to eliminate trench cave-in and allow heavy equipment movement on the site.

The naturally frigid weather of Butte would initialize the freezing process. Thereafter, the groundwater would be impregnated with liquid nitrogen to supplement freezing. This would not freeze the LNAPL due to its composition and resistance to freezing temperatures. The liquid nitrogen would not contribute to additional contamination of the groundwater because, in its gaseous state, it is a natural element located in 78 percent of the earth's atmosphere. The liquid nitrogen would evaporate into gaseous nitrogen upon warming.

After the groundwater has frozen to the depth desired, a hydraulic suction pump would be utilized to skim the unfrozen LNAPL. The LNAPL would be temporarily stored in tanks on the site. Transportation to the nearest incinerator, located in Salt Lake City, Utah, would be arranged. Then the total smear zone could be excavated with the exact depth viewed in a clear cross-section of the excavation face (Hendricks).

The remainder of this alternative is identical to Alternative 5B.

Utilizing Alternative 6 reduces the risk of mixing the LNAPL with the aquifer as ARCO fears is inevitable in the currently proposed alternatives. If Alternatives 5A, 5B or 5C are utilized, an open body of water would be present for a unknown period of time after

excavation. An open body of water entertains a host of serious biological and physical hazards. Utilizing groundwater freezing would eliminate this problem.

Prior to implementing this alternative, a pilot program is recommended. An impartial environmental testing firm would be contracted for on-site evaluation. Terms of implementability, effectiveness, and cost must be predefined (Ray) to enable the firm to make the final analysis. A final report would then be submitted to Butte-Silver Bow, EPA, MDHES and ARCO.

Suggested Model:

Encapsulate a 50 x 100 square foot area down to bedrock level using steel sheetpiling to eliminate outside contamination of the test site. The test area must be randomly selected from the saturated zone. Excavation, freezing, and skimming would be implemented as described above. The pilot program would be used to determine viability of this proposed alternative.

THE REMEDY SELECTION PROCESS

Alternative 5B is the EPA and MDHES's preferred alternative when evaluated and compared by the following nine criteria mandated by Superfund law.

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how potential risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.
2. Compliance with applicable or relevant and appropriate requirements (ARARs) addresses whether or not a remedy will comply with identified federal and state environmental laws.
3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time.
4. Reduction of toxicity, mobility and volume through treatment refers to the degree that the remedy reduces toxicity, mobility and volume of the contamination.

5. Short-term effectiveness addresses the period of time needed to complete the remedy and any adverse impact on human health and the environment that may be posed during the construction and implementation period.
6. Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed to carry out a particular option.
7. Cost evaluates the estimated capital costs and operation and maintenance costs of each alternative for 30 years.

8. State agency acceptance indicates whether the state concurs with, opposes, or has no comment on the preferred alternative. However, for the Montana Pole site, the State is the lead management agency and EPA is the support agency. As such, the state has identified the preferred remedy and EPA has agreed with that identification.
9. Community acceptance is based on whether community concerns are addressed by the preferred remedy and whether or not the community has a preference for a remedy. MDHES and EPA are compelled by law to balance community concerns with all of the other criteria. After the public comment period, MDHES and EPA will complete the evaluation of the alternatives in light of public comments received. (MDHES Proposed Plan 12-13)

EVALUATION OF ALTERNATIVES 5B AND 6

1. Alternatives 5B and 6 provide the greatest degree of protection of human health and the environment.
2. Alternatives 5B and 6 are the only alternatives which require all accessible contaminated sources removed.
3. Because Alternatives 5B and 6 are the most comprehensive, they provide the greatest assurance of long-term effectiveness and permanence.
4. Because all accessible sources of contamination are removed, Alternatives 5B and 6 provide the greatest reduction of toxicity, mobility, and volume of groundwater contamination. However, Alternative 6 reduces groundwater contamination more significantly than Alternative 5B.
5. Alternative 5B could expose workers and nearby residents to hazardous chemicals. However, due to the short duration of an on-site incinerator, if an on-site one is used at all, the health risk to nearby residents would be low. Alternative 6 would reduce the hazards significantly due to groundwater freezing.

6. Both alternatives are implementable.
7. Alternative 5B is the most expensive, but the cost after 30 years would be minimal. The cost of Alternative 6 must be determined.
8. EPA and MDHES have accepted Alternative 5B.
9. Public comment period has been extended until July 7, 1993.
The public comment phone number is (800) 648-8465.

EVALUATION SUMMARY

Due to the comprehensive nature of Alternative 5B, it was evaluated to be the best proposed alternative according to each of the nine criteria. However, many speculations to the effective implementability of this alternative remain. It is entirely possible that Alternative 5B would further contaminate the groundwater. Industrial risk exposure is also a factor in this alternative. In addition, it may not be feasible for heavy equipment to operate below groundwater levels due to the instability of the soil. Since Alternative 6 addresses these problems, it must be researched and evaluated as a viable cleanup alternative.

CONCLUSION

A major, national precedent will be set from the outcome of the MPTP cleanup. It is critical that all alternatives be investigated and presented before making a final decision. Conflicting technical opinions indicate that none of the proposed alternatives are suitable. The findings of this report offer other alternatives that address the problems with the currently proposed alternatives.

It is crucial to Butte, to other aquifer recipients, and to future generations that this problem be addressed in a timely, comprehensive manner. Neither endless study nor inadequate solutions are acceptable. We must begin effective work immediately.

GLOSSARY

Acronyms

AMC:	Anaconda Minerals Company
ARCO:	Atlantic Richfield Company
CERCLA:	Comprehensive Environmental Response, Compensation, and Liability Act
CTEC:	Citizens Technical Environmental Committee
EPA:	U.S. Environmental Protection Agency
LNAPL:	Light Non-Aqueous Phase Liquid
MDHES:	Montana Department of Health and Environmental Sciences
MPTP:	Montana Pole Treatment Plant
NCP:	National Oil and Hazardous Substances Contingency Plan
NPL:	National Priorities List
PA/SI:	Preliminary Assessment/Site Inspection
PAH:	Polycyclic Aromatic Hydrocarbon
PCP:	Pentachlorophenol
PRP:	Potentially Responsible Party
RI/FS:	Remedial Investigation/Feasibility Study
SARA:	Superfund Amendments and Reauthorization Act

Definitions

Administrative Order on Consent:

A legal contract.

Aquifer:

An underground rock formation composed of materials such as sand, soil, and gravel that can store and supply groundwater to wells, springs, lakes, and streams.

Biological Land Treatment:

Contaminated soils are excavated and placed in a lined treatment unit where various techniques are used to enhance biological activity and breakdown of contaminants.

Bioremediation Process:

Using the combination of fungus and soil washing to clean soil.

Bioslurry Reactor:

A large tank in which water, nutrients, and air are added to encourage biological breakdown of contamination. The soil is later dewatered and returned to the excavated area where it can be treated further through another technology.

Carcinogens:

Cancer causing agents.

Dewater:

Extracting water from an area.

Dioxin:

Chemical compound by-products occurring from the manufacture of herbicides, wood preservatives and other products.

Electric Reactors:

An electrical vat for an industrial reaction.

Excavate:

Dig out and remove soil.

Furans:

A flammable liquid that is obtained from wood oils of pines or made synthetically.

Groundwater:

The supply of fresh water contained beneath the earth's surface.

In-situ:

Activity occurring in-place or without removing the contaminated material.

Industrial Risk Exposure:

Potential harm to workers on the site.

Liquid Nitrogen:

A liquid form of the element nitrogen.

Light Non-Aqueous Phase Liquid (LNAPL):

Woodtreating fluids (a mixture of petroleum oil and pentachlorophenol) which are found floating on the groundwater at the MPTP site.

Penta-Oil:

Diesel that was the primary wood preservative.

Pentachlorophenol (PCP):

A crystalline compound used especially as a wood preservative, fungicide, and a disinfectant.

Photochemical Process:

Of or relating to the chemical action of radiant energy especially light.

Plume:

The three-dimensional volume of contaminated materials in the ground water, so named because its shape often resembles a feather or "plume".

Polycyclic Aromatic Hydrocarbons (PAH):

Compounds formed by industrial processes and during the burning of gasoline, waste materials, and many other substances. PAHs include some of the most powerful carcinogens.

Potentially Responsible Party (PRP):

Individuals or companies such as owners, operators, transporters, or waste generators potentially responsible for, or contributing to, contamination problems at a Superfund site. Whenever possible EPA requires PRPs through administrative and legal actions to clean up hazardous waste sites.

Precedent:

Justifies a subsequent act of the same or analogous kind.

Remedial Investigation/Feasibility Study (RI/FS):

During the remedial investigation, the types, amounts and locations of contamination at a site are identified. In the feasibility study, alternatives for site remedy are identified, screened, and compared.

Residual:

Leaving a residue that remains effective for some time.

Reverse Hydraulic Mining Suction:

A high-powered suction pump used to extract soils.

Risk Assessment:

An evaluation performed to assess conditions at sites and determine the risk posed to public health and/or the environment.

Sludges:

Muddy or slushy mass deposit.

Smear Zone:

Varying depths of soil contamination by the floating LNAPL due to the seasonally fluctuating groundwater table.

Soil Vitrification:

Inserting electrical probes into the ground to crystallize the area.

Soil Washing:

Building a basin, placing the contaminated dirt on a liner and sprinkling water over it to wash out the contamination.

Solar Ultraviolet Light:

Employing radioactive light from the sun.

Successor-in-Interest:

New owner.

Super Critical Water Ion Exchange:

A reversible interchanging of ions to soften or demineralize water.

Surface Capping:

Covering contaminated soil with layers of barrier materials such as clean soil, clay, asphalt or concrete.

WORKS CITED

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Hendricks, Thomas. Citizens Technical Environmental Committee, "TAG" Assistant, Montana College of Mineral Science and Technology. Personal Interview, 25 May 1993 and 10 June 1993.

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Montana Department of Health and Environmental Sciences (MDHES) and Environmental Protection Agency (EPA). Montana Pole Superfund Site Progress (May 1989): 1-4.

Montana Pole Superfund Site Public Hearing. Tuesday, May 25, 1993. 7:00 p.m.-9:00 p.m. Butte, Montana.

The Montana Standard. (October 25, 1991)

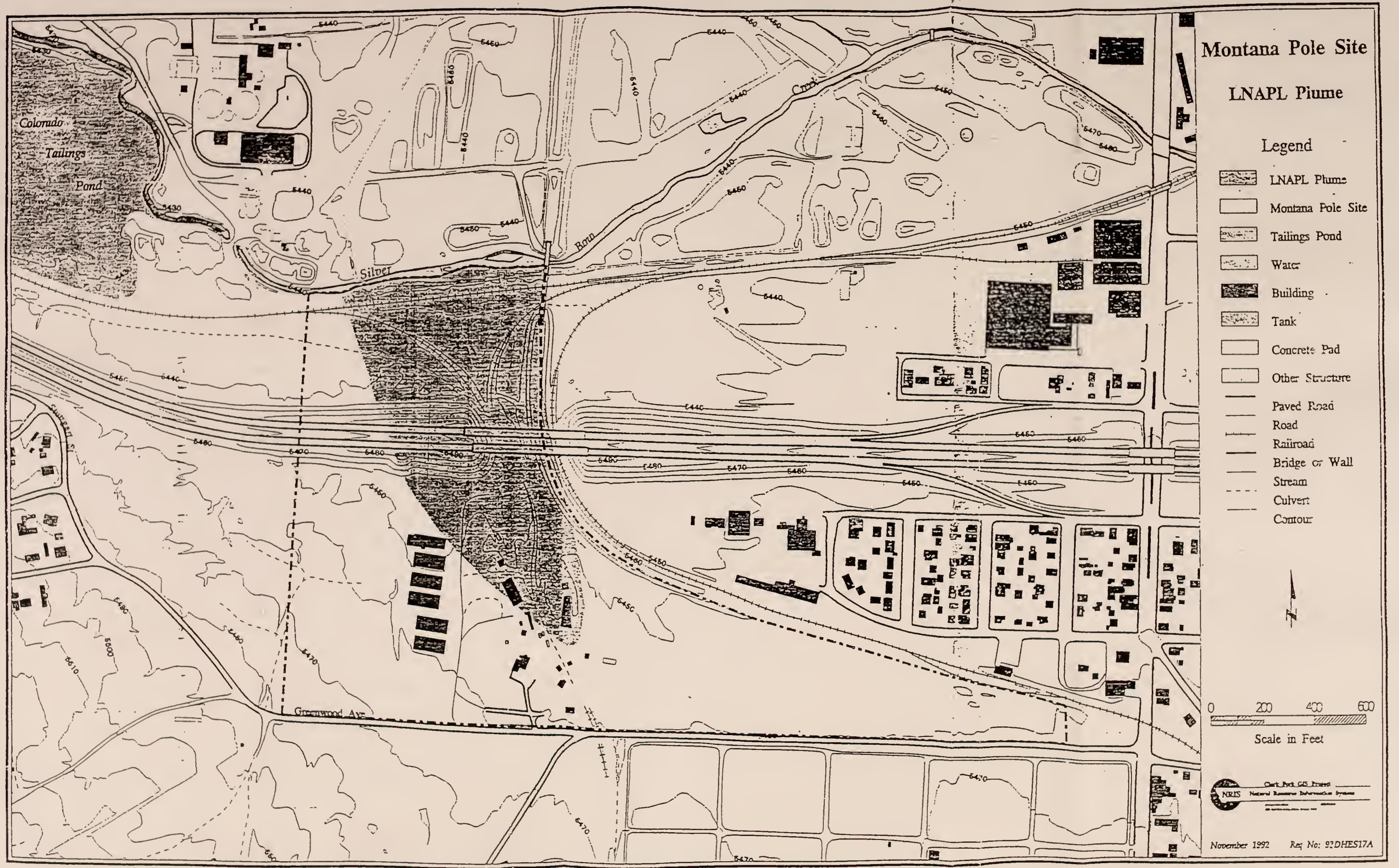
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Stash, Sandra. Director Silver Bow Creek/Butte cleanup project, ARCO. Public Hearing Statement. 25 May 1993.

APPENDIX

Map 3-1: Montana Pole Site LNAPL Plume,	
November 1992	37
Map 3-2: Montana Pole Site Surface Contamination,	
November 1992	38
Map 3-3: Montana Pole Site Surface and Subsurface Contamination,	
November 1992	39
Map 3-4: Montana Pole Site Monitoring Wells,	
November 1992	40



Montana Pole Site

LNAPL Plume

Legend

- LNAPL Plume
- Montana Pole Site
- Tailings Pond
- Water
- Building
- Tank
- Concrete Pad
- Other Structure
- Paved Road
- Road
- Railroad
- Bridge or Wall
- Stream
- Culvert
- Contour

0 200 400 600
Scale in Feet

Clark Fork GIS Project
NRIS
National Resource Information System

November 1992 Req No: 92DHES17A

Figure 3-1.

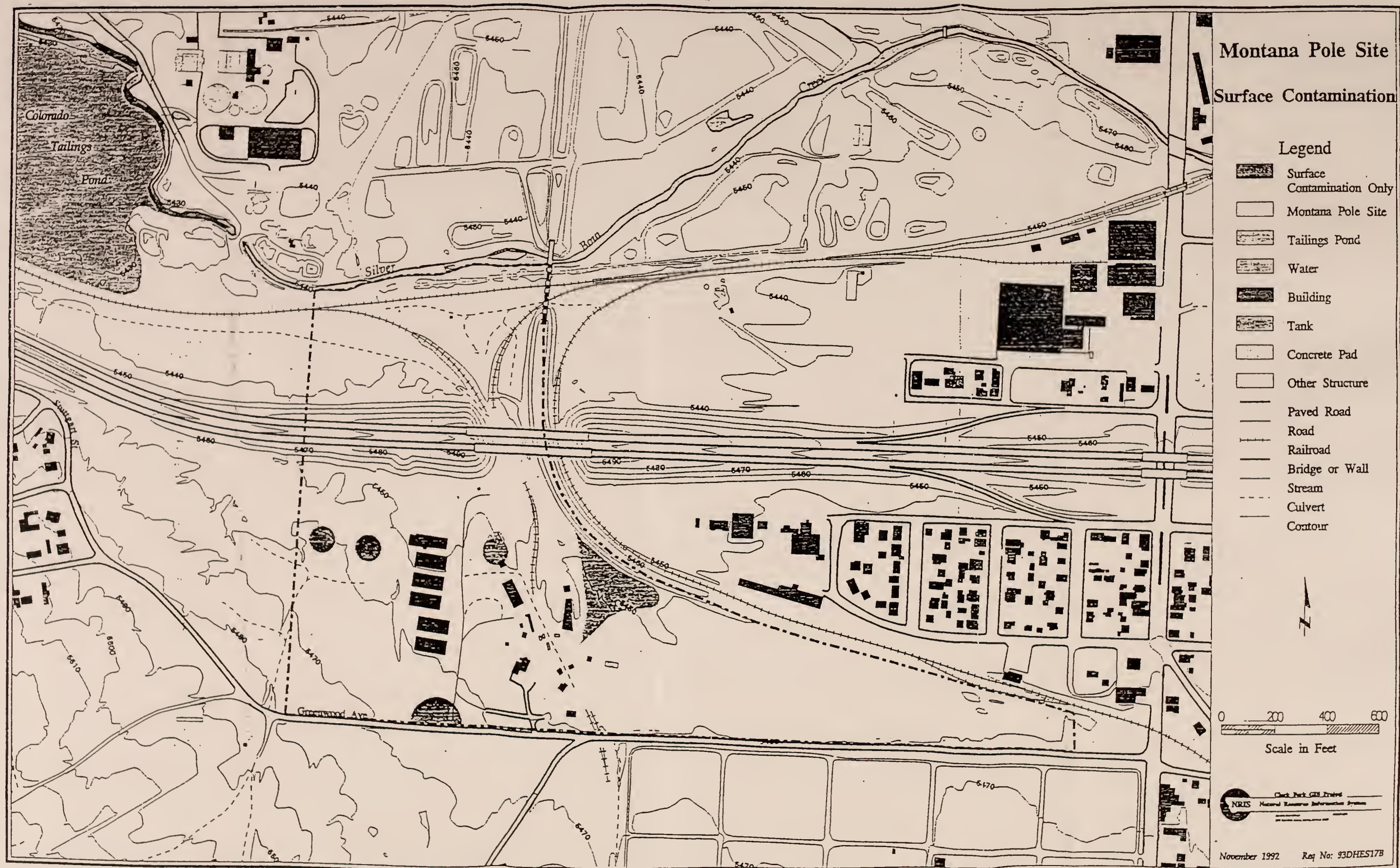


Figure 3-2

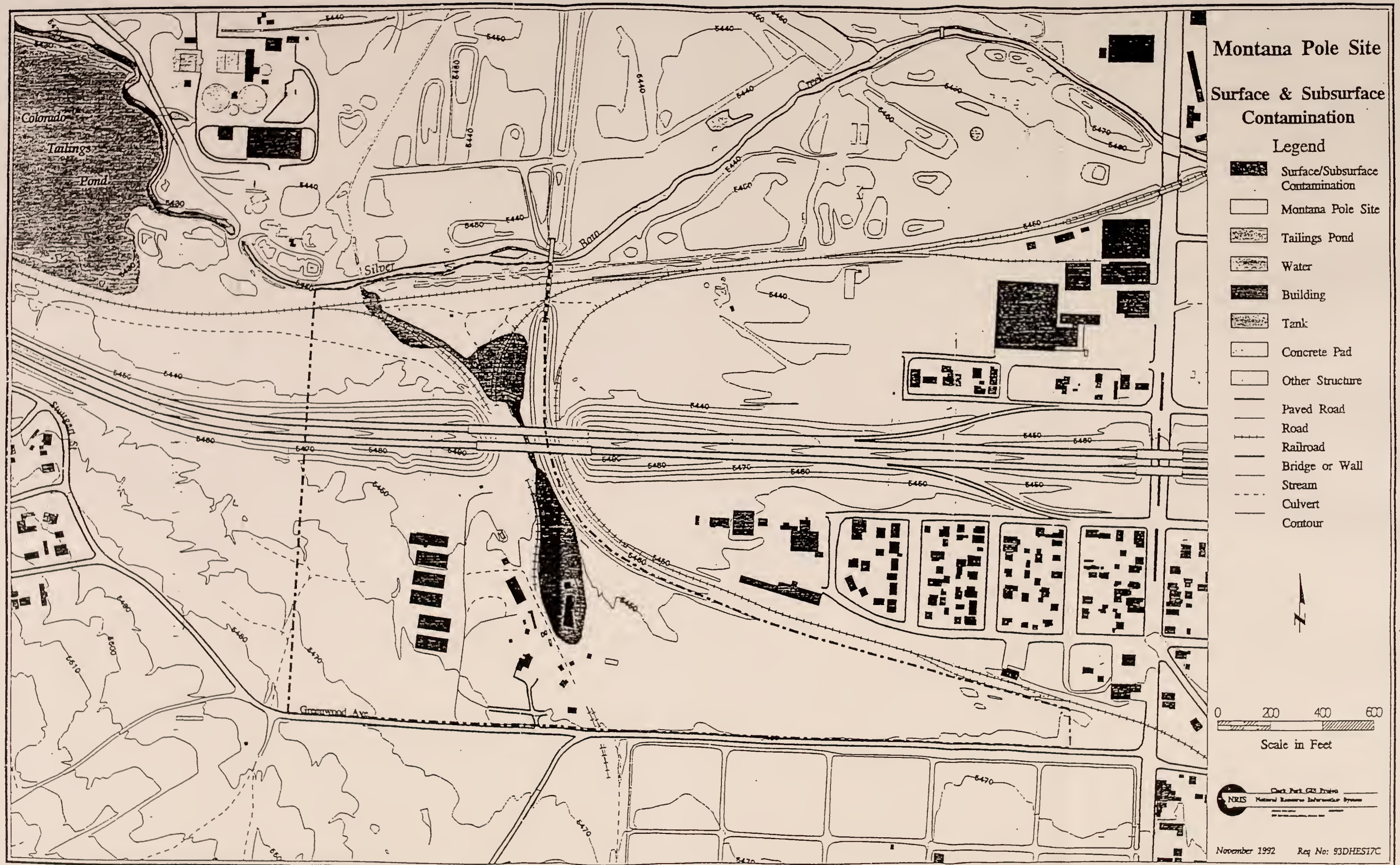


Figure 3-3.

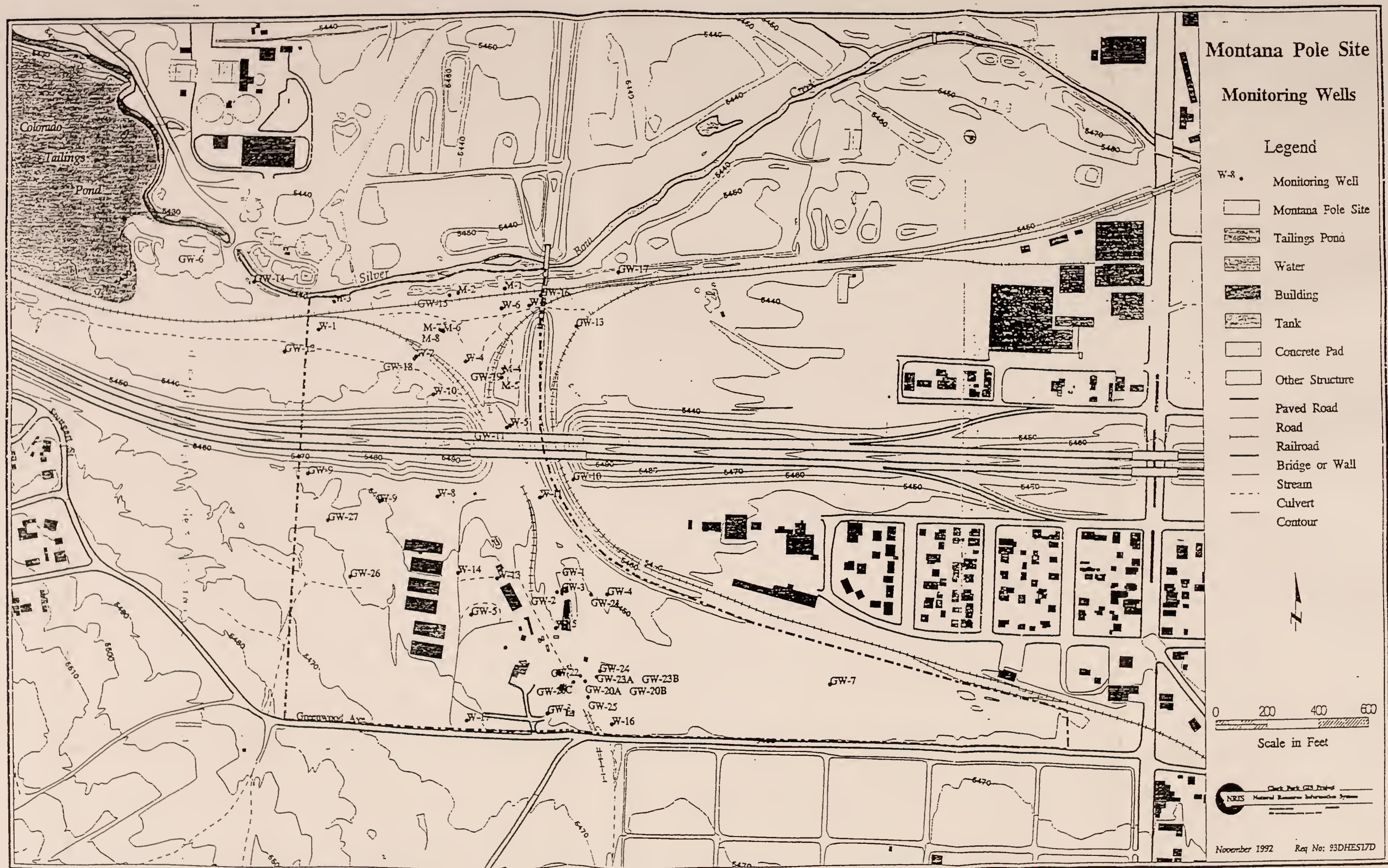
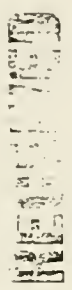
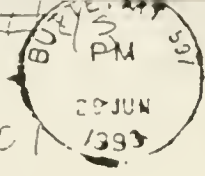


Figure 3-2

DONALD RITTER #413
53 W. PARK
BUTTE, MT. 59701



Montana Dept. of Health
and Human Services
State Bureau

BRIAN ANTONICHI
MONTANA DEPT. OF HEALTH &
ENVIRONMENTAL SCIENCES
COGSWELL BLDG.
HELENA, MT. - 59620

USPS 99

Dear Brian Antonicchi,
I agree with the
Montana State Plan #513, and
I am opposed to ARCO Plan.
I agree with the State Plan.
about the Montana State Treatment
Plant near Helena St. in Butte.

Donna R. Ritter

RECEIVED

JUN 14 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

June 12, 1993

To: Brian Antonielli

Even though I did call the telephone number to give my comment about the Montana Pole Site, I feel that I must address the same comments more or less to you as Project Manager.

First of all, excavating the soil below the ground water level (4 feet) will only serve one purpose. It will spread the contamination through the soil and groundwater. It will also spread deeper into the aquifer of this area and can only worsen the problem. (What a joke the idea of excavating the soil underneath the groundwater level really is!!)

Second comes the idea of cover for this area - plant some grass, flowers and shrubs after the proper preparation so no form of moisture reaches the area - perhaps a park or a picnic area - etc.

Last of all, concerns the ^(ground) water in that area maybe used for drinking some years in the future. You must be kidding? Or a better question might be

Do you believe in the tooth fairy?
After nearly 100 years of mining
and smelting work was done in
this area and during this time
nothing was done to protect the
soil. Then so you can only clean
the soils and groundwater the best
that you can and let "Mother Nature"
do the rest.

I hope that my letter hasn't
shocked you to much!!

Sincerely

Mrs. Nicki Leiss
702 Hwy. 1 West #5
Anaconda, MT.
59711



307 East Park Street, Suite 400
Anaconda, Montana 59711

Mr. Brian Antonoli
MDHES

Solid & Hazardous Waste Bureau
Steamboat Block - Room 302
Helena, Montana 59620

MONTANA POLE RESPONSIVENESS SUMMARY

APPENDIX D

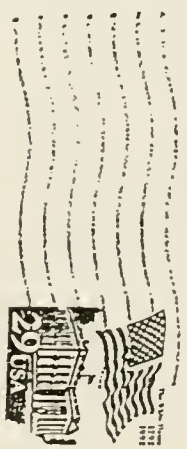
Comments Received After the Close of the Comment Period

1700 Biceland Ln,
Missoula, MT 59801

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

AUG 04 1993

MISSOULA



Mr. Brian Antonick
Montana Dept. of Health and
Environmental Sciences
Cougsville Bldg.
Helena, MT 59620

1710 Birchwood Ln.
Missoula, MT 59801
Aug. 6, 1993

Mr. Brian Antonio
State Project Director
MT. Dept. of Health and Environmental Science
Cogswell Building
Helena, MT 59620

Dear Mr. Antonio:

I am writing in support of the State's plan (alternative 5B) to clean up the Montana Pole Treatment Plant near Silver Bow Creek, south of Interstate 90.

ARCO should not have its way on this. The difference in cost should not be the consideration -- it's the long term we should be considering.

Again, the State Plan has my support.

Sincerely,

Edwin Rosenkranz

(By Sirkehan/Cenoe Shoster)

483 1550817 5572E005 R59

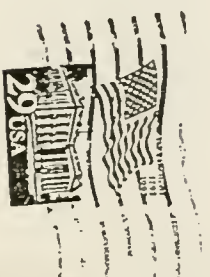
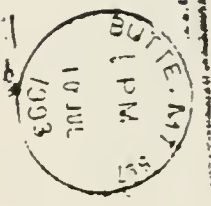
MR. EDWIN ROSENKRANZ
1710 BIRCHWOOD LANE
MISSOULA, MT 59801

Steenburg
1031 Utah Ave.
Butte, MT 59701

Superfund

Montana Dept. of Health & Environmental Sciences
P.O. Box 200901, Capitol Bldg.
Helena, MT

59620



1031 Utah Avenue
Butte, MT 59701
June 20, 1993

MT Dept. of Health and Environmental Sciences
P. O. Box 200901
Cogswell Building
Helena, MT 59620

Regarding: Montana Pole Plant

To Whom It May Concern:

This is a comment on the Proposed Plan for the Montana Pole Superfund Site.

The maximum amount of contaminants should be excavated from the site. For Butte, the biological treatment sounds better than incinerating. The material that remains under the highway should be removed, also, even if the overpass has to be rebuilt.

It is unthinkable to just cover the area with clean dirt or grass. ARCO seems to think that if they can't get 100.0% of all the contamination, they should not have to try to get as much as possible.

Our family will have to live with the decision you make and, while it has been a very time consuming, confusing and frustrating process, the bottom line is that we've had enough cancer in the Butte area. It's time to say so!

Sincerely yours,

Sue Gassenberg

Sue Gassenberg

RECEIVED

JUL-12 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

1829-1/2 Grand Avenue
Butte, MT 59701
June 19, 1993

Montana Dept. of Health and Environmental Sciences
P. O. Box 200901
Cogswell Building
Helena, MT 59620

RE: Pole Plant Public Comment

Dear Sirs:

It is important to remove the PCP's and other toxic chemicals from the pole plant in Butte. This should be done by excavation, not just pumping and treating the ground water. We don't want to have to rely on a pumping plant that must operate longer than the history of mankind.

I believe you have to think about future generations not just what ARCO wants to do.

Thank you.

Joe Boyle
Joe Boyle

RECEIVED

JUL 08 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

842 Lexington
Butte, MT 59701
June 20, 1993

RECEIVED

JUL 08 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

Mr. Brian Antonioli
Montana Dept. of Health and Environmental Sciences
P. O. Box 200901
Cogswell Building
Helena, MT 59620

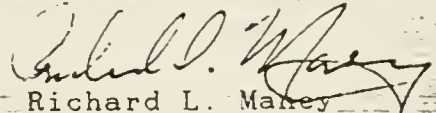
RE: Montana Pole Treatment Plant

Dear Mr. Antonioli:

For the record, I and my family do not want the cancer-causing chemicals at the Montana Pole Plant to remain there. We strongly urge the state to excavate and treat the maximum amount of these pollutants. We support Alternative 5B, and want the state to also remove the bridge to access the remaining pollution.

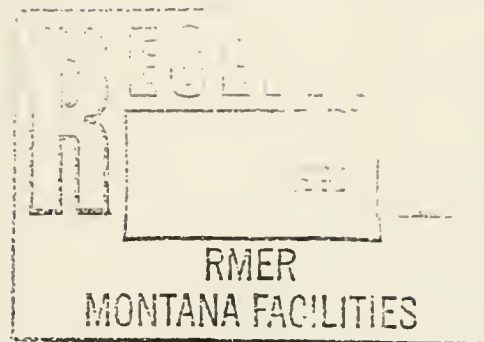
Thank you.

Yours very truly,


Richard L. Maney

TONY VEAZEY
2710 Raymond Ave.
Missoula MT 59802

June 25, 1993



ARCO
Attention: Sandra M. Stash
Montana Superfund Mgr.
307 E. Park St., Suite 400
Anaconda MT 59711

This is in response to your letter of June 4th, presenting ARCO's position on the Montana Pole Plant cleanup proposal.

While I do not have expert qualifications in these matters, I am well acquainted with the Butte/Silver Bow Creek areas, having grown up in Butte.

It strikes me as unreasoning to establish an objective of drinking quality water at the subject location while the threat of water contamination from the Berkeley pit remains, and given the other potentials for pollution of the creek and groundwater in this vicinity.

The opinion of ARCO that excavation of contaminated soil as deep as four feet below groundwater level is neither efficient nor cost effective appears to me to be well founded.

I would appreciate your continuing to keep me on your mailing list.

Sincerely yours,

RECEIVED

JUL 06 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau



July 12, 1993

Mr. Brian Antonioli
Montana Dept. of Health
and Environmental Sciences
Cogswell Building
Helena, Montana 59620

RECEIVED

JUL 1 1993

DHES LEGAL DIVISION

RE: Public Comment - Implementability/Feasibility Issues -
Montana Pole Treatment Plant

Dear Brian:

As mentioned in our phone conversation Monday, I learned from Bill Kirley on Friday that the issues of "feasibility" and "implementability" are still being challenged by ARCO.

You'll note from the attached letter I sent to Messrs. Pedersen and Wardell on June 18, 1993 that I was under the impression ARCO had come into agreement with EPA and the State that excavation below the groundwater table was something that could be accomplished. My understanding of ARCO's current argument is that they have targeted the "effectiveness" criteria in their contention that enough contamination might escape capture to keep them from meeting mcl's on site and that, therefore, they should not be made to try.

While it is a few days since the "Public Comment Period" deadline closed on July 7th, I am attaching for your perusal some of my many public statements on the subject of "implementability." You should already have as "public comment" my statement at your May 25 public meeting in Butte (attached). New to you herewith are statements before the Butte-Silver Bow Council of Commissioners, one of which you heard since you were at their June 9th meeting. For their June 16th meeting, in addition to my attached statement, there is an official tape recording kept by Pam O'Leary in the Clerk and Records Office at the Butte Courthouse. As I told you I would do, I attempted to obtain Minutes of the meeting, and found they are simply a summary of actions, and do not reflect discussion. Only the tape documents discussion of implementability issues with statements by me, CTEC, Sandy Stash and Albert Mollignoni. I have provided below a summary, from my notes, of statements made on the implementability issue, and I request you use this letter as official public comment.

RECEIVED

JUL 16 1993

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

P.O. Box 7593
Missoula, MT 59807
406/542-0539

P.O. Box 4718
Butte, MT 59702
406/723-4061

P.O. Box 1096
Sandpoint, ID 83864
208/253-0347

I trust that because these comments were, indeed, in the public venue prior to close of the Public Comment period, you can still accept them for review and response. Also, because confusion as to what was or was not an issue is a result of

the fact that we have been excluded from meetings between PRP's and EPA/DHES, we believe it is appropriate for you to address these comments related to feasibility and implementability.

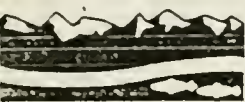
From the attached, you will see that on June 9, the Coalition expressed the belief to the Council that it is preemptive for ARCO, in their feasibility arguments, to attempt to require the State to design the workplan for its preferred remedy prior to a remedy being chosen. We have felt a number and type of physical and hydrological barriers can be specified in the workplan that will be protective and assure capture of sufficient contaminants so that mcl's can be met on-site.

In my attached statement to the Council of June 16, I said, "it is no longer disputed whether or not excavation below the water table is both feasible and implementable." I referred to the manganese removal where clear water, not mud, flowed into trenches 6 to 8 feet below the water table. I also recommended the Council reconsider asking the State to "guarantee" its preferred plan works; rather, that they ask ARCO to prove the State's plan doesn't work, which I do not believe they can do.

In Sandy Stash's comments, she said mine contained what she felt were "inaccuracies". She then referred to Mr. Bossard's experience with the manganese removal as very difficult, working in "muck." Her comments were confusing in that I distinctly had the impression she eventually agreed implementability and feasibility were no longer at issue and, rather, that she was addressing "effectiveness" albeit with vague arguments. I was given an opportunity to respond.

I stated there were proven implementation technologies available and that just one of these, identified by CTEC staff in relation to the pole plant, was the possible use of liquid nitrogen to freeze/stabilize the soils. I related that this technology had been used successfully at the World Trade Center in New York City, which was built by excavating many stories below the groundwater table. I said this technology could be used as an adjunct, if necessary, to supplement Mother Nature's natural wintertime stabilization of the soils. Also on this Council meeting tape, Mr. Albert Mollignoni makes a statement concerning the fact ARCO planned their Streamside Tailings Demonstration Project in Rocker so that soils would be moved in February when the ground would be frozen/stable.

Mr. Mollignoni also pointed out to Butte's Council of Commissioners that the pole plant is different from the manganese removal situation referred to by Sandy Stash because a backhoe was the equipment with which Mr. Bossard encountered problems in the wet tailings. He said use of a "drag line" at the pole plant would likely alleviate any equipment difficulties, particularly in the more stable pole plant soil. My remarks pointed out the comparative ease of working in soils at the pole plant vs. the



June 18, 1993

Mr. Dick Pedersen
Montana Dept. of Health
and Environmental Sciences
Cogswell Building
Helena, Montana 59620

Mr. John Wardell
U.S. Environmental Protection Agency
Region VIII, Montana Office
Federal Building
301 South Park, Drawer 10096
Helena, MT 59626-0096

RE: Facilitating Community Acceptance in Superfund

Dear Mr. Pedersen and Mr. Wardell:

On two recent occasions, the public has learned tardily of important information which I believe your Agencies should bring to the public, rather than the public relying on their own investigative resources to discover.

The first of these is the May 21, 1993 letter to your Agencies from the Chief Executive of Butte-Silver Bow County and ARCO's Rocky Mountain Environmental Remediation Manager, two PRP's in the Butte Priority Soils Operable Unit. Through my own inquiries, I learned of this proposal for potential remediation of lead. I contacted the Chairman of the Butte LLAC and learned the committee was unaware of the agreement struck between the County and ARCO and presented to your Agencies. I brought the letter to the attention of the Butte Citizens Technical Environmental Committee at their June 10, 1993 meeting in Rocker. Members of that Committee, for which I am a member of the Board of Directors, were also unaware of the proposal. It is my understanding that it was agreed at the outset that work done by the volunteer Butte LLAC would not be used as a driving force for Superfund lead clean-up; therefore, I am concerned about reliance on that work as discussed in the County/ARCO proposal. I hope that any reply from the Agencies recognizes this, and that you will see fit to include the our Coalition, CTEC and Butte LLAC in the circle of those "in the know" as you develop your response to the PRP's proposal.

P.O. Box 7593
Missoula, MT 59807
406/542-0539

P.O. Box 4718
Butte, MT 59702
406/723-4061

P.O. Box 1096
Sandpoint, ID 83864
208/263-0347

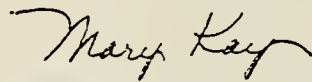
Secondly, I am disappointed that my time and efforts over the past couple of weeks were apparently wasted on a "non-issue" because of lack of communication from the Agencies or ARCO. Since early May (when the State/EPA "Proposed Plan" for the Montana Pole Treatment Plant was issued and the public comment period began) most of my time

known instability of tailings such as at the manganese removal. Yet, I also mentioned the availability of a video that shows walls of wet tailings did not collapse during the Lower Area One manganese removal.

I have read the above to Mr. Molignoni and he feels it accurately characterizes his statements before the Council of Commissioners for the purpose of inclusion in your public comments.

Thank you for your consideration in allowing review of these comments. If you desire to have a copy of the Council meeting tape, or a transcript of it, I will arrange to have a copy produced.

Yours very truly,



Mary Kay Craig
Upper River Field Representative

Attachments

cc: C.B. Pearson, CF-POC, Missoula
John Wardell, EPA, Helena
Dick Pedersen, DHES, Helena
Don Pizzini, EPA, Helena
Bill Kirly, DHES, Helena
Albert Molignoni, Rocker



Clark Fork - Pend Oreille Coalition

P.O. Box 7593 • Missoula MT 59807 • (406) 542-0539

P.O. Box 1096 • Sandpoint ID 83864 • (208) 263-0347

P. O. Box 4718, Butte, MT 59702 (406) 494-3655

Statement to Butte-Silver Bow Council of Commissioners 6/16/93

Dear Council Members:

Tonight you are in the powerful position of voting on an issue that has ramifications, for good or ill, on the health of citizens downstream from Butte from now until forever.

If you vote for alternative 3, you vote to leave cancer-causing chemicals in the ground and pump and treat the groundwater forever. You assume the money and expertise will be there to pump and treat hundreds and thousands of years from now. You assume the economy will be such in the far-off future that a trust fund won't be spend for other issues future Commissioners decide are more acute. You assume the economy of the future will keep a trust fund growing -- no bank crises. You assume Butte's citizens of the future agree to accept liability for running a nuts, bolts and friction plagued water treatment plant from now to forever.

If, on the other hand, you vote to do the best possible clean up now, rather than saving it for your children, you will vote for alternative five. You will vote to be rid of the cause of the problem to the maximum extent possible - forever.

I have several comments, and changes I suggest be made, in the draft letter from Butte-Silver Bow Local Government to the State Department of Health and Environmental Sciences.

Item 4, a comment: This may take 30 years or it may be a never-ending process, depending on how much of the remaining contaminated soils are removed and treated. ARCO says remove and treat 13,000 cu. yds. more soil. The State says all of it -- 195,000 cu. yards as in Alternative 5.

In the first paragraph at the bottom of the page, the word "technically" in the 3rd line can be removed, since it is no longer disputed whether or not excavation below the water table is both feasible and implementable. ARCO no longer argues that it is not do-able. It was done in the worst possible situation at Lower Area One in removal of manganese where clear water, not mud, flowed into trenches 6 to 8 feet below the water table.

three paragraphs. This word is avoided by the Butte-area Superfund site's major responsible party. ARCO refers instead to "long term effectiveness" which appears only once in the same three paragraphs.

Alternative 3B, capping the site after treatment of a small amount of the carcinogenic contaminants - leaving contamination in place - what ARCO prefers to do - is not a permanent remedy.

Our third point is that decisions made for clean-up standards at the Montana Pole Site are precedent-setting. This is the first site in Butte for which a permanent remedy will be chosen. Butte-Silver Bow must be a good municipal citizen, not only to its neighbors downstream, but to its own people. If ARCO is allowed to escape the required water quality standards here, it will be much easier for them to argue for lower quality clean-up standards throughout the entire Clark Fork Basin -- from Milltown to the Berkeley Pit, including Butte stormwater run-off and over 100 miles of toxic Streamside Tailings.

Agreement issues, as discussed here by Jon Sesso are obvious. Deferment of "contentious issues" only plays to the delays that are of advantage only to ARCO -- saying they can't deal with Milltown or the Streambed until this site and others in Butte are done.

In conclusion, the Clark Fork Coalition suggests Butte-Silver Bow and the Agencies give as much consideration to the word, "permanence," as ARCO does to the word, "cost." We ask you to choose the one remedy that gives maximum clean-up through maximum removal and treatment. Only #5 does that. Please do not compromise our health and the health of future generations by deferring to offset compensation in lieu of maximum clean-up. Three ball fields and other favors from ARCO are not good enough to offset your childrens' health. I've had cancer. If you had had cancer, I assure you, you would support 5B.

Thank you.

Thank you.



Clark Fork - Pend Oreille Coalition

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P.O. Box 1096 • Sandpoint ID 83864 • (208) 263-0347

P. O. Box 4718, Butte, MT 59702 (406) 723-4061

Butte-Silver Bow Council of Commissioners

June 9, 1993, 1993

Statement of the Clark Fork - Pend Oreille Coalition on the Proposed Plan for Remediation of the Montana Pole Superfund Site

My name is Mary Kay Craig. I was born and raised in Butte and I live here. I work for about 1500 fishermen as the Upper River Field Representative for the Clark Fork - Pend Oreille Coalition, a non-profit, grass-roots citizens organization with members and volunteers from Butte and Anaconda, through Deer Lodge and Missoula to Lake Pend Oreille in Sandpoint, Idaho. The Coalition's mission is protection of the entire Clark Fork Watershed, and work from the headwaters. Butte office is 99% oversight of Superfund clean-up activities.

The pole site remedy must do everything possible to meet mcl's - maximum contaminant levels - on site for PCP's. ARCO prefers not to have to meet the required water quality standards and likes to call into question and confuse people as to whether or not it is technically feasible to do so. It is pre-emptive for them to do this. The workplan and design will not be created until after a decision is made on the amount of soil to be removed and treated. The Coalition encourages the Agencies to incorporate a sufficient number and type of barriers and containment systems into that design and workplan - even to go beyond what might currently be envisioned. Water quality standards are ARAR's -- "applicable, appropriate and relevant" and must be met as threshold criteria for remedies in Superfund law.

The Coalition reminds Butte-Silver Bow and the Agencies that permanence of remediation is required by Superfund law. In fact on October 17, 1986, CERCLA was amended by passage of the Superfund Amendments and Reauthorization Act (SARA). Among other things, it expressed Congress' bias in favor of "permanent" treatment.

A glance at the new provision in the law, Section 121, "Cleanup Standards," reveals that the word "permanent" or "permanently" appears four times on the same page within the first

"permanent" treatment.

A cursory glance at SARA's new provision, Section 121, "Cleanup Standards," reveals that the word "permanent" or "permanently" appears four times on the same page within the first three paragraphs (100 U.S. Statutes, page 1672). It's a word assiduously avoided by the Butte-area Superfund site's major responsible party. ARCO refers instead to "long term effectiveness" which appears only once in the same three paragraphs.

Alternative 3B, capping the site after treatment of a small amount of the carcinogenic contaminants - leaving contamination in place - what ARCO prefers to do - is not a permanent remedy.

3. Our third point is that decisions made for clean-up standards at the Montana Pole Site are precedent setting. This is the first site in Butte for which a permanent remedy will be chosen. If ARCO is allowed to escape the required water quality standards here, it will be much easier for them to argue for lower quality clean-up standards throughout the entire Clark Fork Basin -- from Milltown to the Berkeley Pit, including Butte stormwater run-off and over 100 miles of toxic Streamside Tailings.

Agreement issues, as discussed here by ARCO and Butte-Silver Bow are obvious. Deferment of "contentious issues" only plays to the delays that are of advantage only to ARCO.

The Coalition commends the Agencies for the high quality of the technology and information provided to the public.

And in conclusion, the Clark Fork Coalition suggests the State and EPA give as much consideration to the word, "permanence," as they do to the word, "cost." Mr. Pizzini just said they must be prepared to justify costs. We hope the Agencies will also put themselves in a position to justify anything less than a very definitely permanent remedy.

Thank you.



Clark Fork - Pend Oreille Coalition

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Public Meeting in Butte
May, 25, 1993

Statement of the Clark Fork - Pend Oreille Coalition on the Proposed Plan for Remediation of the Montana Pole Superfund Site

My name is Mary Kay Craig. I was born and raised in Butte and reside here. I work for a bunch of fishermen, fisherwomen and fisherchildren. I am the Upper River Field Representative for the Clark Fork - Pend Oreille Coalition, a non-profit, grass-roots organization made up of about 1500 members and volunteers from Butte and Anaconda, downstream through Deer Lodge and Missoula to Lake Pend Oreille in Sandpoint, Idaho. The Coalition's mission is protection of the entire Clark Fork Watershed, and work from the headwaters. Butte office is 99% oversight of Superfund clean-up activities.

The Montana Department of Health and Environmental Sciences and the U.S. Environmental Protection Agency, in their May, 1993 document entitled, "Proposed Plan," presented their Preferred Remedy, 5B. The Coalition supports that plan and asks the Agencies to take the following factors into account:

1. The remedy must do everything possible to meet mcl's - maximum contaminant levels - for PCP's on site. ARCO prefers not to have to meet the required water quality standards and likes to call into question whether or not it is technically feasible to do so. The Coalition encourages the Agencies to incorporate a sufficient number and type of barriers and containment systems into the design and workplan - even to go beyond what they might currently envision. Water quality standards are "applicable, appropriate and relevant" and must be met as threshold criteria for remedies in Superfund law.
2. The Coalition reminds the Agencies that permanence of remediation is required by Superfund law. In fact on October 17, 1986, CERCLA was amended by passage of the Superfund Amendments and Reauthorization Act of 1986 (SARA). Among other things, it expressed Congress' bias in favor of

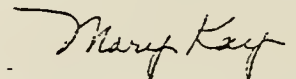
has been spent facilitating community understanding of the issues involved. I personally distributed over 100 copies of the "Proposed Plan" to concerned citizens. In so doing, I discussed the implementability issue with them, and asked they contact their Butte-Silver Bow County Commissioner with their opinion regarding maximum removal and treatment of contaminated soils before the expected vote June 9, and again for the vote the following week. On Monday, June 14, I learned that the major point of disagreement between ARCO and the Agencies on which I had focused, "implementability" or "feasibility," had not been at dispute for about two weeks. In retrospect I now realize ARCO discontinued arguing it was impossible to excavate below the water table. This wasn't evident earlier, however, because their subsequent unsupported arguments on degree of "effectiveness" are nebulous and seemingly related.

We are concerned that lack of timely information is preventing full knowledge and discussion by the community. I sincerely believe that, as our representatives who desire to obtain public input, it is incumbent on the Agencies to keep at least the actively concerned members of the public up-to-date on key issues.

Another suggestion: when news media are obviously confused about technical Superfund issues with news reports continually misleading to the public, perhaps the Agencies might help clear up misconceptions. Folks in Butte still think advisability of using Bioremediation is in dispute between all parties, while the real issues of concern at the Pole Plant have not been adequately presented in the media. What is the your policy on this?

Thank you for considering these matters. I look forward to hearing from you.

Yours very truly,



Mary Kay Craig
Upper River Field Representative

cc: C.B. Pearson, Missoula

On page 2, second line, I suggest the word, "permanently," be inserted so it reads, "and permanently removes the maximum amount..." etc.

A comment regarding item 1) in the same paragraph: Excavation, not pump and treat into perpetuity, is the only way water quality standards can be met. There is no justification for not trying to meet them. Regarding 2), cost, the manganese was removed at a very reasonable cost of \$4.40 per cu. yard in the worst possible scenario - tailings.

In the paragraph beginning, "Third," the word, "intolerable" is very strong and implies all other considerations, including concerns about human health, should take a back seat to timing. I suggest a change to read, "Any delay in the LAO work schedule would be unfortunate..."

A further comment on this issue of timeliness is that any lawsuit threats by ARCO, a citizens group, or anyone else who wishes to influence this council to their way of thinking must be disregarded in your thoughtful decision that protects human health. Nor can you be held hostage by those who fund, then threaten not to fund, any special departments or programs of Butte-Silver Bow.

The "Fourth" item, fourth line, I suggest you insert the word, "soon," so it reads, "While the County holds no unrealistic expectation that the site will soon be remediated..." This simply recognized that Mother Nature will again have a pristine site here thousands of years from now, and it will be sooner if we remove and treat the cause of the contamination.

Concerning the inset: It is strongly recommended that Butte-Silver Bow recognize the rights to potential owners of the pole site property decades and hundreds of years from now by not changing the status quo of its zoning provisions. If the county defers to ARCO's wish to change the zoning provision, it amounts to Zoning driving the clean-up. It is a reversal from Butte's previous stance that clean-up shall drive the zoning. Recommendation: strike the word "compromise" on the fourth line and the entire next sentence (3 lines).

A last comment is that on page 3, the word "guarantees" be changed to "hopefully assures." There should be no burden put on the people of the State of Montana to "guarantee" anything. Why not ask ARCO to prove the state's plan doesn't work. ...They can't.

The Clark Fork - Pend Oreille Coalition is concerned that a precedent could be set here for not meeting water quality standards throughout the entire Clark Fork basin. We urge Butte-Silver Bow to be good neighbors to the folks downstream.

Thank you.

Mary Kay Craig

Opinion, comment

Our readers speak

Cleanup plan needs your help

Final decisions are being made for Superfund cleanup of cancer-causing chemicals at the Montana Pole Plant. Community opinions are needed to the State by July 7th.

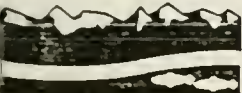
The State's Proposed Plan (EPA agrees with it) is for a permanent solution: excavate all possible contaminated soil and destroy the intermixed chemicals that enter groundwater and Silver Bow Creek. (All parties agree bioremediation is the best way to do this.) A groundwater pumping facility would capture missed chemicals, sending the uncontaminated water to the creek. It might run 30 years until contaminants are gone. At least the need for it will end some day.

ARCO is opposed to this approach. They don't want to remove all hazardous chemical-soaked soils — just 7% — those easiest to get at. Since they must pay for the pumping facility anyway, they argue it should run forever — hundreds or thousands of years — instead of removing the source of the problem.

Many Butte citizens and people downstream think going along with ARCO would be wrong. For one, their children, yours, and future generations of Butte families should not have to worry about maintaining pumping equipment forever. The 200 years of U.S. independence is a fraction of the time of nuts, bolts and friction-plagued facility would have to operate. Superfund requires permanent solutions; ARCO's is not permanent.

Costs depend on how much soil is treated: all 195,000 cu. yds. ranges \$27-\$55 million; ARCO's 13,000 costs \$21-\$36 million. Figures cover only 30 years, so it's curious that ARCO prefers a plan they acknowledge must be maintained "in perpetuity."

If local people don't speak up, they run the risk of their kids being stuck with a never-ending problem. Write to Dept. of Health and Environmental Sciences, Cogswell Bldg., Helena. 59620. For more information: 1-800-648-8465 or 723-4061. — MARY KAY CRAIG, 3400 Hill Ave., Clark Fork-Pend Oreille Coalition



Brian - These are handouts I used with
the nearly 200 copies of the State's Proposed
Plan I distributed to the public. -mkc
July 2, 1993

Butte's Unique Opportunity to Fight Cancer

I've had cancer. Seems like everyone in Butte has a relative or close friend who's been through chemo or is "six feet under" due to the big C.

I'll never know what caused my cancer. Who could? It doesn't show up for years after exposure to some carcinogenic substance. While a relative of mine used to play out at the Montana Pole Treatment Plant as a child, there is no way to say her subsequent cancer, nor that of her playmate, was caused by the chemicals there.

But it is a known fact that the chemicals at the pole plant can cause cancer. And through Superfund, Butte area residents have an unique opportunity to help get rid of them.

Old pole-preserving chemicals, PCP's, PAH's, Dioxin and Furans, in the pole plant soils have been found downstream past Rocker. Some quick response actions have been taken by EPA to control releases into the groundwater and Silver Bow Creek, and the final remedy will be chosen soon.

The public comment period on the State of Montana's preferred cleanup plan will close July 7th. Community opinions are needed now.

The proposed plan developed by the State of Montana (EPA agrees with it) is for a permanent solution -- not a "pump and treat" forever solution. Their plan calls for excavating all possible contaminated spoils and then destroying, once and for all, the cancer-causing chemicals that enter the groundwater and Silver Bow Creek. All parties agree the best way to do this is through bioremediation (use of fungus or bacteria to break the chemicals down into unharmed carbon dioxide and water). Along with this, a groundwater pumping facility that has already been built would capture missed chemicals, sending uncontaminated water to the creek. This facility might have to run for 30 years or more until contaminants are gone. At least the need for it would end some day.

ARCO is opposed to this approach. They don't want to remove all the hazardous chemical-soaked soils. They think taking less than 7% of them -- the soils that are least expensive to get at -- is enough. Then, since they have to pay for the pumping station anyway, they want to let it run for unknown hundreds or thousands of years, instead of removing the source of the problem.

Many Butte citizens and people downstream think it would be wrong to go along with ARCO. For one, their children,

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208/263-0347



June 28, 1993

Dear Neighbor --

Finally, decisions are being made on an important Superfund issue. Your opinion is urgently needed on the Montana Pole Treatment Plant near Montana Street.

The Proposed Plan developed by the State of Montana (EPA agrees with it) is for a permanent solution -- not a "pump and treat" forever solution. Their plan calls for excavating all possible contaminated soils and then destroying, once and for all, the cancer-causing chemicals that enter the groundwater and Silver Bow Creek. Along with this, a groundwater pumping facility that has already been built would capture dissolved chemicals that might be left behind, sending uncontaminated water to the creek. This facility might have to run for 30 years or more until contaminants are gone. At least there will be an end to the need for it.

ARCO is opposed to this approach. They don't want to remove all the hazardous chemical-soaked soils. They think taking less than 7% of them -- the soils that are least expensive to get at -- is enough. Their logic goes that, since they have to pay for the pumping station anyway, let it run for thousands of years, instead of removing the source of the problem.

Many Butte citizens and people downstream think it would be wrong to go along with ARCO. For one, your children and future generations of Butte families should not have to worry about maintaining the pump-and-treat equipment forever. The 200 year history of the U.S. is a fraction of the time the nuts, bolts and friction-plagued pumping station would have to operate. Superfund requires permanent solutions; this is not permanent. The icing on the cake is that some dissolved chemicals may bypass the pumping facility in any case. Surely, risks will never end if the source is not removed.

Costs? The State's plan (referred to as #5B) ranges from \$27.5 to \$55.2 million. The way ARCO wants to handle it (#3B) will cost from \$21.0 to \$36.6 million. The big difference is the amount of soils removed and treated -- 195,000 cu. yds. in the State of Montana plan; only 13,000 cu. yds. in ARCO's. (Incidentally, all parties do agree the use of fungus or bacteria (bioremediation) is the best way to destroy the carcinogens -- PCP's, PAH's, dioxin and furans.)

If the people affected don't speak up, they run the risk of their kids being stuck with a never-ending problem. Your neighbors need your help. Write to Brian Antonioli, Montana Dept. of Health and Environmental Sciences, Cogswell Bldg., Helena, MT 59620, or call him at 1-800-648-8465. Thanks for your help!

*P.S. The public comment
period ends July 7th!*

Mary Kay
Mary Kay Craig, Butte

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Butte, MT 59702
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208/263-0347

Dear Neighbor -

PLEASE CALL JACK LYNCH AND TELL HIM TO SUPPORT THE STATE'S
RECOMMENDED ALTERNATIVE - #5B.

Alternative 5B is the only one that calls for maximum removal and treatment of the cancer-causing chemicals in the soils and groundwater at the Montana Pole Treatment Plant. Even with this most protective of human health plan, groundwater will have to be treated for about 30 years, maybe more. At least there will be an end to the need for pumping and treating. The alternative preferred by ARCO, #3B, removes very little of the contamination and relies on pumping and treating groundwater forever.

I'd sure like to answer your questions on any Superfund issue, so please call me. I'm Butte born and raised and live here. I work part-time for the Clark Fork - Pend Oreille Coalition, a non-profit citizens group with members and volunteers from Butte and Anaconda, through Deer Lodge and Missoula to Lake Pend-Oreille in Sand Point, Idaho. I attend most all Superfund meetings as an advocate for the best possible clean-up and for restoring fishing opportunities in the headwaters of the Clark Fork River. I'm also a member of the Board of CTEC, Butte's Citizens Technical Environmental Committee; I serve on the Technical Support Group for MSE's Pit Resource Recovery Project and am a volunteer with Butte's economic development Action Citizen's Team for Capturing Dollars related to Superfund.

Decisions on the pole plant clean-up will be made soon. The public comment period ends July 7th. Thanks for getting involved now. It's our one chance to be rid of toxins that threaten future generations of Butte kids as well as our neighbors downstream.

Mary Kay
Mary Kay Craig

I need your input, so please reach me at 723-4061 (work) or 494-3655 (home). And drop a note about the need for maximum removal of hazardous chemicals at the Pole Plant to the State's Project Officer, Brian Antonioli, MDHES, Cogswell Building, Helena, MT 59620; and write or call 723-8262 to Jack Lynch, Butte-Silver Bow Chief Executive, Courthouse, Butte, 59701.

P.S. This subject will be on the agenda of the Council of Commissioners meeting Wednesday, June 16th, so please talk to your County Commissioner, too.

PARCEL, MAURO, HULTIN & SPAANSTRA, P.C.

ATTORNEYS AT LAW
SUITE 3600
1801 CALIFORNIA STREET
DENVER, COLORADO 80202-2636
TELEPHONE: (303) 292-6400
TELECOPIER: (303) 293-3040

FAX

PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME: William Kirley, Esq.

DATE: July 25, 1993

FIRM: Montana Dept. of Health and
Environmental Sciences

PHONE: (406) 449-4067

FAX: (406) 443-7312

FROM: Robert F. Copple, Esq.

FILE #: 01499.601

NUMBER OF PAGES (including this cover page): 21

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Suite 400, First Security Bank Building
307 East Park Street
Anaconda, Montana 50711
Telephone 406 563 5211
Facsimile 406 563 8269

July 26, 1993

VIA FACSIMILE ONLY

Mr. Brian Antonioli
Solid and Hazardous Waste Bureau
Montana Department of Health and
Environmental Sciences
Cogswell Building
Helena, Montana 59620

William B. Kirley, Esq.
Montana Department of Health
and Environment
Cogswell Building, Legal Unit
Helena, Montana 59620

D. Henry Elsen, Esq.
Office of Regional Counsel
Montana Office
U.S. EPA, Region VIII
Federal Building
301 South Park Street
Helena, Montana 59626

Carolyn Doris, Esq.
U.S. Environmental Protection
Agency, Region VIII
999 18th Street, Suite 500
Denver, Colorado 80202-2405

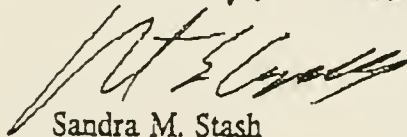
Re: Montana Pole and Treating Plant Superfund Site: New Cost Estimates

Dear Brian, Bill, Henry and Carolyn:

As I mentioned to Bill last week, ARCO has significant new information concerning the estimated costs of remedial alternatives for the Montana Pole and Treating Plant Superfund Site based on increased estimates of soil to be removed and recalculation of present values. I am submitting that information to you with this letter as a supplement to ARCO's public comments for inclusion in the record and to allow you to review this information prior to the July 27, 1993 EPA meeting in Helena.

Please call me if you have any additional questions.

Sincerely, *for Sandra M. Stash*



Sandra M. Stash

Enclosures

cc: Sherry M. Purdy, Esq.
William J. Duffy, Esq.
Robert F. Copple, Esq.

COST SUMMARY (in \$millions)

Alternative	Present Worth - 5%		Present Worth - 7%		Total Cost	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
GB	\$19.6	\$39.3	\$17.6	\$35.0	\$33.9	\$61.0
SB	\$30.2	\$64.1	\$27.4	\$57.9	\$43.6	\$92.0

ESTIMATED COST FOR REMEDIAL ALTERNATIVE 3B
(Total Cost)Soil: Capping and Bioremediation
Groundwater: Oil/Water Separation Followed by Bioremediation and Carbon Polishing
Oily Wastes and Sludge: Off-Site Incineration

Item/Description	Quantity	Unit	Unit Cost		Total Cost	
			Min.	Max.	Min.	Max.
<i>Institutional Controls</i>						
Implementation	1	lump sum	\$75,000	\$75,000	\$75,000	\$75,000
Annual Institutional Controls	30	years	\$10,000	\$10,000	\$300,000	\$300,000
Five Year Site Review	5	each	\$40,000	\$80,000	\$240,000	\$360,000
<i>Groundwater Monitoring</i>						
Well Installation	4	each	\$1,200	\$2,000	\$4,800	\$8,000
Analytical/Reporting	30	years	\$70,000	\$151,000	\$2,100,000	\$4,530,000
<i>Containment</i>						
Clay Cover	170,000	sq. ft.	\$12	\$19	\$1,987,000	\$3,194,000
Common Borrow	16,000	cu. yd.	\$8	\$15	\$128,000	\$240,000
Clay Cover Maintenance	30	years	\$50,000	\$70,000	\$1,500,000	\$1,680,000
<i>Treatment and Disposal</i>						
<i>Soil</i>						
Excavation/Backfill	28,000	cu. yd.	\$17	\$30	\$476,000	\$840,000
Bioremediate	28,000	cu. yd.	\$68	\$158	\$1,904,000	\$4,424,000
Transportation	11,000	cu. yd.	\$4	\$8	\$44,000	\$88,000
<i>Groundwater</i>						
Treatment Facility	1	lump sum	\$981,000	\$1,090,000	\$981,000	\$1,090,000
Extraction Facility	1	lump sum	\$371,000	\$557,000	\$371,000	\$557,000
Infiltration Facility	1	lump sum	\$133,000	\$168,000	\$133,000	\$168,000
Bioreactor	72,580	1,000 gal/yr	\$7	\$14	\$15,293,000	\$30,989,000
<i>City Wastes and Sludge</i>						
Off Site Incineration	131,500	gallon	\$17	\$26	\$2,209,200	\$3,471,600
<i>Equipment and Debris</i>						
Mob/Decon/Disposal	1	lump sum	\$1,500,000	\$1,720,000	\$1,600,000	\$1,720,000
SUBTOTAL					\$29,350,000	\$53,730,000
Contractors Overhead and Profit					\$1,304,000	\$2,082,000
Contractors Mobilization and Demobilization					\$978,000	\$1,561,500
Engineering Design					\$1,304,000	\$2,082,000
Administrative Costs					\$978,000	\$1,561,500
TOTAL COST					\$33,914,000	\$61,017,000

Volume of soils to be treated and excavated includes the 11,000 cubic yards of near-creek soils, as estimated by EPA.
Note that the FS used 6,000 cubic yards instead of 11,000 cubic yards.

7/23/93

ESTIMATED COST FOR REMEDIAL ALTERNATIVE 3B

Soil: Bioremediation (2 years)

Groundwater: Oil/Water Separation Followed by Bioremediation and Carbon Polishing

Oily Wastes and Sludge: Off-Site Incineration

Item/Description	Duration	Quantity	Unit	Unit Cost		Total Cost	
				Min.	Max.	Min.	Max.
CAPITAL COSTS							
Institutional Controls							
Implementation	1st year	1	lump sum	\$75,000	\$75,000	\$75,000	\$75,000
Groundwater Monitoring							
Well Installation	1st year	4	each	\$1,200	\$3,000	\$4,800	\$8,000
Containment							
Clay Cover	3rd year	170,000	sq. ft.	\$12	\$19	\$1,987,000	\$3,194,000
Common Borrow	1st year	16,000	cu. yd.	\$8	\$15	\$128,000	\$240,000
Treatment and Disposal							
Soil							
Fixed Costs	1st year	1	lump sum	\$695,000	\$2,482,000	\$695,000	\$2,482,000
Transportation	1st year	11,000	cu. yd.	\$4	\$8	\$44,000	\$88,000
Groundwater							
Treatment Facility	1st year	1	lump sum	\$981,000	\$1,090,000	\$981,000	\$1,090,000
Extraction Facility	1st year	1	lump sum	\$371,000	\$557,000	\$371,000	\$557,000
Infiltration Facility	1st year	1	lump sum	\$133,000	\$168,000	\$133,000	\$168,000
Oily Wastes and Sludge							
Off-Site Incineration	1st year	30,000	gallon	\$17	\$26	\$504,000	\$792,000
Equipment and Debris							
Mob/Decon/Disposal	1st year	1	lump sum	\$1,600,000	\$1,720,000	\$1,600,000	\$1,720,000
SUBTOTAL						\$6,520,000	\$10,410,000
Contractors Overhead and Profit @ 20%						\$1,304,000	\$2,082,000
Contractors Mobilization and Demobilization @ 15%						\$978,000	\$1,561,500
Engineering Design @ 20%						\$1,304,000	\$2,082,000
Administrative Costs @ 15%						\$978,000	\$1,561,500
TOTAL CAPITAL REQUIREMENT						\$11,080,000	\$17,700,000

ESTIMATED COST FOR REMEDIAL ALTERNATIVE JB

Soil: Bioremediation (2 years)

Groundwater: Oil/Water Separation Followed by Bioremediation and Carbon Polishing

Oily Wastes and Sludge: Off-Site Incineration

Item/Description	Duration	Quantity	Unit	Unit Cost		Total Cost	
				Min.	Max.	Min.	Max.
OPERATION AND MAINTENANCE COSTS							
Institutional Controls							
Institutional Controls	Year 1 - 30	1	lump sum	\$10,000	\$10,000	\$10,000	\$10,000
Five Year Site Review	Every 5 years	1	lump sum	\$40,000	\$60,000	\$40,000	\$60,000
Groundwater Monitoring							
Analytical/Reporting	Year 1 - 30	1	year	\$70,000	\$151,000	\$70,000	\$151,000
Containment							
Clay Cover Maintenance	Year 4 - 30	1	lump sum	\$50,000	\$70,000	\$50,000	\$70,000
Treatment and Disposal							
Soil							
Excavation/Backfill	Year 1 - 2	14,000	cu. yd.	\$17	\$30	\$238,000	\$420,000
Bioremediation	Year 1 - 2	14,000	cu. yd.	\$38	\$50	\$532,000	\$696,000
Groundwater							
Bioreactor	Year 1 - 30	72,580	1,000 gallons	\$7	\$14	\$510,000	\$1,030,000
Oily Wastes and Sludge							
Off-Site Incineration	Year 2 - 30	3,500	gallons	\$17	\$26	\$58,800	\$92,400
Annual cost for year 1						\$1,360,000	\$2,320,000
Annual cost for year 2						\$1,420,000	\$2,410,000
Annual cost for year 3						\$657,000	\$1,300,000
Annual cost for years 4 - 30						\$707,000	\$1,370,000

PRESENT WORTH

Duration	30 years		
Discount rate	5 percent	\$19,630,000	\$39,270,000

PRESENT WORTH - 5 Percent
(min.)

YEAR	CAPITAL COSTS	O&M COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$7,702,100	0	\$7,702,100	1.000	\$7,702,100	\$7,702,100
1	\$0	\$1,360,000	\$1,360,000	0.952	\$1,295,238	\$8,997,338
2	\$0	\$1,420,000	\$1,420,000	0.907	\$1,287,982	\$10,285,320
3	\$3,377,900	\$657,000	\$657,000	0.864	\$567,541	\$10,852,861
4	\$0	\$707,000	\$707,000	0.823	\$581,651	\$11,434,512
5	\$0	\$707,000	\$707,000	0.784	\$553,953	\$11,988,465
6	\$0	\$707,000	\$707,000	0.746	\$527,574	\$12,516,039
7	\$0	\$707,000	\$707,000	0.711	\$502,452	\$13,018,491
8	\$0	\$707,000	\$707,000	0.677	\$478,525	\$13,497,016
9	\$0	\$707,000	\$707,000	0.645	\$455,739	\$13,952,755
10	\$0	\$707,000	\$707,000	0.614	\$434,037	\$14,386,791
11	\$0	\$707,000	\$707,000	0.585	\$413,368	\$14,800,160
12	\$0	\$707,000	\$707,000	0.557	\$393,684	\$15,193,844
13	\$0	\$707,000	\$707,000	0.530	\$374,937	\$15,568,781
14	\$0	\$707,000	\$707,000	0.505	\$357,083	\$15,925,864
15	\$0	\$707,000	\$707,000	0.481	\$340,079	\$16,265,943
16	\$0	\$707,000	\$707,000	0.458	\$323,885	\$16,589,828
17	\$0	\$707,000	\$707,000	0.436	\$308,462	\$16,898,290
18	\$0	\$707,000	\$707,000	0.416	\$293,773	\$17,192,063
19	\$0	\$707,000	\$707,000	0.396	\$279,784	\$17,471,847
20	\$0	\$707,000	\$707,000	0.377	\$266,461	\$17,738,308
21	\$0	\$707,000	\$707,000	0.359	\$253,772	\$17,992,080
22	\$0	\$707,000	\$707,000	0.342	\$241,688	\$18,233,768
23	\$0	\$707,000	\$707,000	0.326	\$230,179	\$18,463,947
24	\$0	\$707,000	\$707,000	0.310	\$219,218	\$18,683,165
25	\$0	\$707,000	\$707,000	0.295	\$208,779	\$18,891,944
26	\$0	\$707,000	\$707,000	0.281	\$198,837	\$19,090,781
27	\$0	\$707,000	\$707,000	0.268	\$189,369	\$19,280,150
28	\$0	\$707,000	\$707,000	0.255	\$180,351	\$19,460,501
29	\$0	\$707,000	\$707,000	0.243	\$171,763	\$19,632,264

30 YEAR TOTAL PRESENT WORTH **\$19,632,264**

PRESENT WORTH - 5 Percent
(max.)

YEAR	CAPITAL COSTS	O&M COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$12,270,200	0	\$12,270,200	1.000	\$12,270,200	\$12,270,200
1	\$0	\$2,320,000	\$2,320,000	0.952	\$2,209,524	\$14,479,724
2	\$0	\$2,410,000	\$2,410,000	0.907	\$2,185,941	\$16,665,665
3	\$5,429,800	\$1,300,000	\$1,300,000	0.864	\$1,122,989	\$17,788,654
4		\$1,370,000	\$6,799,800	0.823	\$5,594,212	\$23,382,866
5	\$0	\$1,370,000	\$1,370,000	0.784	\$1,073,431	\$24,456,297
6	\$0	\$1,370,000	\$1,370,000	0.746	\$1,022,315	\$25,478,612
7	\$0	\$1,370,000	\$1,370,000	0.711	\$973,633	\$26,452,245
8	\$0	\$1,370,000	\$1,370,000	0.677	\$927,270	\$27,379,515
9	\$0	\$1,370,000	\$1,370,000	0.645	\$883,114	\$28,262,630
10	\$0	\$1,370,000	\$1,370,000	0.614	\$841,061	\$29,103,691
11	\$0	\$1,370,000	\$1,370,000	0.585	\$801,011	\$29,904,701
12	\$0	\$1,370,000	\$1,370,000	0.557	\$762,867	\$30,667,569
13	\$0	\$1,370,000	\$1,370,000	0.530	\$726,540	\$31,394,109
14	\$0	\$1,370,000	\$1,370,000	0.505	\$691,943	\$32,086,052
15	\$0	\$1,370,000	\$1,370,000	0.481	\$658,993	\$32,745,045
16	\$0	\$1,370,000	\$1,370,000	0.458	\$627,613	\$33,372,658
17	\$0	\$1,370,000	\$1,370,000	0.436	\$597,726	\$33,970,385
18	\$0	\$1,370,000	\$1,370,000	0.416	\$569,263	\$34,539,648
19	\$0	\$1,370,000	\$1,370,000	0.396	\$542,156	\$35,081,803
20	\$0	\$1,370,000	\$1,370,000	0.377	\$516,339	\$35,598,142
21	\$0	\$1,370,000	\$1,370,000	0.359	\$491,751	\$36,089,893
22	\$0	\$1,370,000	\$1,370,000	0.342	\$468,354	\$36,558,247
23	\$0	\$1,370,000	\$1,370,000	0.326	\$446,033	\$37,004,260
24	\$0	\$1,370,000	\$1,370,000	0.310	\$424,793	\$37,429,053
25	\$0	\$1,370,000	\$1,370,000	0.295	\$404,565	\$37,833,618
26	\$0	\$1,370,000	\$1,370,000	0.281	\$385,300	\$38,218,918
27	\$0	\$1,370,000	\$1,370,000	0.268	\$366,952	\$38,585,870
28	\$0	\$1,370,000	\$1,370,000	0.255	\$349,478	\$38,935,348
29	\$0	\$1,370,000	\$1,370,000	0.243	\$332,836	\$39,268,185

30 YEAR TOTAL PRESENT WORTH **\$39,268,185**

ESTIMATED COST FOR REMEDIAL ALTERNATIVE 5B

Soil: Bioremediation (2 years)

Groundwater: Oil/Water Separation Followed by Biotreatment and Carbon Polishing

Oil/Wastes and Sludge: Off-Site Incineration

Item/Description	Duration	Quantity	Unit	Unit Cost		Total Cost	
				Min.	Max.	Min.	Max.
CAPITAL COSTS							
Institutional Controls							
Implementation	1st year	1	lump sum	\$75,000	\$75,000	\$75,000	\$75,000
Groundwater Monitoring							
Well Installation	1st year	4	each	\$1,200	\$2,000	\$4,800	\$8,000
Containment							
Clay Cover	3rd year	170,000	sq. ft.	\$12	\$19	\$1,987,000	\$3,194,000
Common Borrow	1st year	16,000	cu. yd.	\$8	\$15	\$128,000	\$240,000
Treatment and Disposal							
Soil							
Fixed Costs	1st year	1	lump sum	\$695,000	\$2,482,000	\$695,000	\$2,482,000
Transportation	1st year	11,000	cu. yrl.	\$4	\$8	\$44,000	\$88,000
Groundwater							
Treatment Facility	1st year	1	lump sum	\$981,000	\$1,090,000	\$981,000	\$1,090,000
Extraction Facility	1st year	1	lump sum	\$371,000	\$557,000	\$371,000	\$557,000
Infiltration Facility	1st year	1	lump sum	\$133,000	\$168,000	\$133,000	\$168,000
Oily Wastes and Sludge							
Off-Site Incineration	1st year	30,000	gallon	\$17	\$26	\$504,000	\$792,000
Equipment and Debris							
Mob/Decon/Disposal	1st year	1	lump sum	\$1,600,000	\$1,720,000	\$1,600,000	\$1,720,000
SUBTOTAL						\$6,520,000	\$10,410,000
Contractors Overhead and Profit @ 20%						\$1,304,000	\$2,082,000
Contractors Mobilization and Demobilization @ 15%						\$978,000	\$1,561,500
Engineering Design @ 20%						\$1,304,000	\$2,082,000
Administrative Costs @ 15%						\$978,000	\$1,561,500
TOTAL CAPITAL REQUIREMENT						\$11,080,000	\$17,700,000

ESTIMATED COST FOR REMEDIAL ALTERNATIVE 3B

Soil: Bioremediation (2 years)
Groundwater: Oil/Water Separation Followed by Bioreatment and Carbon Polishing
Oily Wastes and Sludge: Off-Site Incineration

Item/Description	Duration	Quantity	Unit	Unit Cost		Total Cost	
				Min.	Max.	Min.	Max.
OPERATION AND MAINTENANCE COSTS							
Institutional Controls							
Institutional Controls	Year 1 - 30	1	lump sum	\$10,000	\$10,000	\$10,000	\$10,000
Five Year Site Review	Every 5 years	1	lump sum	\$40,000	\$60,000	\$40,000	\$60,000
Groundwater Monitoring							
Analytical/Reporting	Year 1 - 30	1	year	\$70,000	\$151,000	\$70,000	\$151,000
Containment							
Clay Cover Maintenance	Year 4 - 30	1	lump sum	\$50,000	\$70,000	\$50,000	\$70,000
Treatment and Disposal							
Soil							
Excavation/Backfill	Year 1 - 2	14,000	cu. yd.	\$17	\$30	\$238,000	\$420,000
Bioremediation	Year 1 - 2	14,000	cu. yd.	\$38	\$50	\$532,000	\$696,000
Groundwater							
Bioreactor	Year 1 - 30	72,580	1,000 gallons	\$7	\$14	\$510,000	\$1,030,000
Oily Wastes and Sludge							
Off-Site Incineration	Year 2 - 30	3,500	gallons	\$17	\$26	\$58,800	\$92,400
Annual cost for year 1						\$1,360,000	\$2,320,000
Annual cost for year 2						\$1,420,000	\$2,410,000
Annual cost for year 3						\$657,000	\$1,300,000
Annual cost for years 4 - 30						\$707,000	\$1,370,000

PRESENT WORTH

Duration	30 years		
Discount rate	7 percent	\$17,570,000	\$34,970,000

PRESENT WORTH - 7 Percent
(min.)

YEAR	CAPITAL COSTS	O&M COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$7,702,100	0	\$7,702,100	1.000	\$7,702,100	\$7,702,100
1	\$0	\$1,360,000	\$1,360,000	0.935	\$1,271,028	\$8,973,128
2	\$0	\$1,420,000	\$1,420,000	0.873	\$1,240,283	\$10,213,411
3	\$3,377,900	\$657,000	\$657,000	0.816	\$536,308	\$10,749,719
4	\$0	\$707,000	\$707,000	0.763	\$539,367	\$11,289,086
5	\$0	\$707,000	\$707,000	0.713	\$504,081	\$11,793,167
6	\$0	\$707,000	\$707,000	0.666	\$471,104	\$12,264,271
7	\$0	\$707,000	\$707,000	0.623	\$440,284	\$12,704,555
8	\$0	\$707,000	\$707,000	0.582	\$411,480	\$13,116,035
9	\$0	\$707,000	\$707,000	0.544	\$384,561	\$13,500,596
10	\$0	\$707,000	\$707,000	0.508	\$359,403	\$13,859,999
11	\$0	\$707,000	\$707,000	0.475	\$335,891	\$14,195,890
12	\$0	\$707,000	\$707,000	0.444	\$313,916	\$14,509,807
13	\$0	\$707,000	\$707,000	0.415	\$293,380	\$14,803,186
14	\$0	\$707,000	\$707,000	0.388	\$274,187	\$15,077,373
15	\$0	\$707,000	\$707,000	0.362	\$256,249	\$15,333,622
16	\$0	\$707,000	\$707,000	0.339	\$239,485	\$15,573,108
17	\$0	\$707,000	\$707,000	0.317	\$223,818	\$15,796,926
18	\$0	\$707,000	\$707,000	0.296	\$209,176	\$16,006,102
19	\$0	\$707,000	\$707,000	0.277	\$195,491	\$16,201,593
20	\$0	\$707,000	\$707,000	0.258	\$182,702	\$16,384,295
21	\$0	\$707,000	\$707,000	0.242	\$170,750	\$16,555,045
22	\$0	\$707,000	\$707,000	0.226	\$159,579	\$16,714,624
23	\$0	\$707,000	\$707,000	0.211	\$149,139	\$16,863,764
24	\$0	\$707,000	\$707,000	0.197	\$139,383	\$17,003,146
25	\$0	\$707,000	\$707,000	0.184	\$130,264	\$17,133,411
26	\$0	\$707,000	\$707,000	0.172	\$121,742	\$17,255,153
27	\$0	\$707,000	\$707,000	0.161	\$113,778	\$17,368,931
28	\$0	\$707,000	\$707,000	0.150	\$106,334	\$17,475,263
29	\$0	\$707,000	\$707,000	0.141	\$99,378	\$17,574,643

30 YEAR TOTAL PRESENT WORTH **\$17,574,643**

PRESENT WORTH - 7 Percent
(max.)

YEAR	CAPITAL COSTS	O&M COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$12,270,200	0	\$12,270,200	1.000	\$12,270,200	\$12,270,200
1	\$0	\$2,320,000	\$2,320,000	0.935	\$2,168,224	\$14,438,424
2	\$0	\$2,410,000	\$2,410,000	0.873	\$2,104,987	\$16,543,412
3	\$5,429,800	\$1,300,000	\$1,300,000	0.816	\$1,061,187	\$17,604,599
4		\$1,370,000	\$6,799,800	0.763	\$5,187,535	\$22,792,134
5	\$0	\$1,370,000	\$1,370,000	0.713	\$976,791	\$23,768,925
6	\$0	\$1,370,000	\$1,370,000	0.666	\$912,889	\$24,681,814
7	\$0	\$1,370,000	\$1,370,000	0.623	\$853,167	\$25,534,981
8	\$0	\$1,370,000	\$1,370,000	0.582	\$797,352	\$26,332,333
9	\$0	\$1,370,000	\$1,370,000	0.544	\$745,189	\$27,077,522
10	\$0	\$1,370,000	\$1,370,000	0.508	\$696,439	\$27,773,961
11	\$0	\$1,370,000	\$1,370,000	0.475	\$650,877	\$28,424,838
12	\$0	\$1,370,000	\$1,370,000	0.444	\$608,296	\$29,033,135
13	\$0	\$1,370,000	\$1,370,000	0.415	\$568,501	\$29,601,636
14	\$0	\$1,370,000	\$1,370,000	0.388	\$531,310	\$30,132,945
15	\$0	\$1,370,000	\$1,370,000	0.362	\$496,551	\$30,629,497
16	\$0	\$1,370,000	\$1,370,000	0.339	\$464,066	\$31,093,563
17	\$0	\$1,370,000	\$1,370,000	0.317	\$433,707	\$31,527,270
18	\$0	\$1,370,000	\$1,370,000	0.296	\$405,334	\$31,932,603
19	\$0	\$1,370,000	\$1,370,000	0.277	\$378,816	\$32,311,420
20	\$0	\$1,370,000	\$1,370,000	0.258	\$354,034	\$32,665,454
21	\$0	\$1,370,000	\$1,370,000	0.242	\$330,873	\$32,996,327
22	\$0	\$1,370,000	\$1,370,000	0.226	\$309,221	\$33,305,548
23	\$0	\$1,370,000	\$1,370,000	0.211	\$288,997	\$33,594,551
24	\$0	\$1,370,000	\$1,370,000	0.197	\$270,091	\$33,864,642
25	\$0	\$1,370,000	\$1,370,000	0.184	\$252,421	\$34,117,063
26	\$0	\$1,370,000	\$1,370,000	0.172	\$235,908	\$34,352,971
27	\$0	\$1,370,000	\$1,370,000	0.161	\$220,475	\$34,573,446
28	\$0	\$1,370,000	\$1,370,000	0.150	\$206,051	\$34,779,497
29	\$0	\$1,370,000	\$1,370,000	0.141	\$192,571	\$34,972,068

30 YEAR TOTAL PRESENT WORTH **\$34,972,068**

ESTIMATED COST FOR REMEDIAL ALTERNATIVE 5B
(Total Cost)

Soil: Bioremediation
Groundwater: Oil/Water Separation Followed by Bioremediation and Carbon Polishing
Oily Wastes and Sludge: Off-Site Incineration

Item/Description	Quantity	Unit	Unit Cost		Total Cost	
			Min.	Max.	Min.	Max.
<i>Institutional Controls</i>						
Implementation	1	lump sum	\$75,000	\$75,000	\$75,000	\$75,000
Annual Institutional Controls	1	year	\$10,000	\$10,000	\$300,000	\$300,000
Five Year Site Review	1	lump sum	\$40,000	\$60,000	\$240,000	\$360,000
<i>Groundwater Monitoring</i>						
Well Installation	4	each	\$1,200	\$2,000	\$4,800	\$8,000
Analytical/Reporting	30	years	\$70,000	\$151,000	\$2,100,000	\$4,530,000
<i>Site Preparation</i>						
Excavate/Reconstruct Railroad	1,000	feet	\$100	\$150	\$100,000	\$150,000
<i>Containment</i>						
Soil Cover	51,100	cu. yd.	\$10	\$20	\$511,000	\$1,022,000
Common Borrow	16,000	cu. yd.	\$8	\$15	\$128,000	\$240,000
Cover Maintenance	30	years	\$30,000	\$50,000	\$900,000	\$1,500,000
<i>Treatment and Disposal</i>						
<i>Soil</i>						
Excavation/Backfill	297,000	cu. yd.	\$17	\$75	\$5,049,000	\$22,275,000
Bioremediation	212,000	cu. yd.	\$39	\$63	\$8,268,000	\$13,356,000
Dewater Saturated Soils	114,000	cu. yd.	\$3	\$20	\$342,000	\$2,280,000
Transportation	11,000	cu. yd.	\$4	\$8	\$44,000	\$88,000
<i>Groundwater</i>						
Treatment Facility	1	lump sum	\$981,000	\$1,093,000	\$981,000	\$1,093,000
Extraction Facility	1	lump sum	\$371,000	\$557,000	\$371,000	\$557,000
Infiltration Facility	1	lump sum	\$133,000	\$168,000	\$133,000	\$168,000
Bioreactor	72,580	1,000 gal/yr	\$7	\$14	\$15,242,000	\$30,484,000
<i>Oily Wastes and Sludge</i>						
Off Site Incineration	131,500	gallon	\$17	\$26	\$2,235,500	\$3,419,000
<i>Equipment and Debris</i>						
Mob/Decon/Disposal	1	lump sum	\$1,600,000	\$1,720,000	\$1,600,000	\$1,720,000
SUBTOTAL					\$38,620,000	\$89,630,000
Contractors Overhead and Profit					\$1,420,000	\$2,390,000
Contractors Mobilization and Demobilization					\$1,070,000	\$1,790,000
Engineering Design					\$1,420,000	\$2,390,000
Administrative Costs					\$1,070,000	\$1,790,000
TOTAL COST					\$43,600,000	\$99,190,000

Volumes of soils to be treated and excavated include the 11,000 cubic yards of near-creek soils, as estimated by EPA.
Note that the FS used 6,000 cubic yards instead of 11,000 cubic yards.

7/23/93

ESTIMATED COST FOR REMEDIAL ALTERNATIVE 2B

Soil: Bioremediation (10 years)

Groundwater: Oil/Water Separation Followed by Bioremediation and Carbon Polishing

Oily Wastes and Sludge: Off-Site Incineration

Item/Description	Duration	Quantity	Unit	Unit Cost		Total Cost	
				Min.	Max.	Min.	Max.
CAPITAL COSTS							
<i>Institutional Controls</i>							
Implementation	1st year	1	lump sum	\$75,000	\$75,000	\$75,000	\$75,000
<i>Groundwater Monitoring</i>							
Well Installation	1st year	4	each	\$1,200	\$2,000	\$4,800	\$8,000
<i>Site Preparation</i>							
Excavate and Reconstruct Railroad	1st year	1,000	feet	\$100	\$150	\$100,000	\$150,000
<i>Construction</i>							
Soil Cover	11th year	51,100	cu. yd.	\$10	\$20	\$511,000	\$1,020,000
Common Borrow	1st year	16,000	cu. yd.	\$8	\$15	\$128,000	\$240,000
<i>Treatment and Disposal</i>							
<i>Soil</i>							
Fixed Costs	1st year	1	lump sum	\$2,660,000	\$6,040,000	\$2,660,000	\$6,040,000
Transportation	1st year	11,000	cu. yd.	\$4	\$8	\$44,000	\$88,000
<i>Groundwater</i>							
Treatment Facility	1st year	1	lump sum	\$981,000	\$1,090,000	\$981,000	\$1,090,000
Extraction Facility	1st year	1	lump sum	\$371,000	\$557,000	\$371,000	\$557,000
Infiltration Facility	1st year	1	lump sum	\$133,000	\$163,000	\$133,000	\$163,000
<i>Oily Wastes and Sludge</i>							
Off-Site Incineration	1st year	30,000	gallon	\$17	\$26	\$504,000	\$792,000
<i>Equipment and Debris</i>							
Mob/Decon/Disposal	1st year	1	lump sum	\$1,600,000	\$1,720,000	\$1,600,000	\$1,720,000
SUBTOTAL						\$7,110,000	\$11,950,000
Contractors Overhead and Profit @ 20%						\$1,420,000	\$2,390,000
Contractors Mobilization and Demobilization @ 15%						\$1,070,000	\$1,790,000
Engineering Design @ 20%						\$1,420,000	\$2,390,000
Administrative Costs @ 15%						\$1,066,500	\$1,792,500
TOTAL CAPITAL REQUIREMENT						\$12,090,000	\$20,310,000

ESTIMATED COST FOR REMEDIAL ALTERNATIVE 5B

Soil: Bioremediation (10 years)

Groundwater: Oil/Water Separation Followed by Bioremediation and Carbon Polishing

Oily Wastes and Sludge: Off-Site Incineration

Item/Description	Duration	Quantity	Unit	Unit Cost		Total Cost	
				Min.	Max.	Min.	Max.
OPERATION AND MAINTENANCE COSTS							
Institutional Controls							
Institutional Controls	Year 1 - 30	1	lump sum	\$10,000	\$10,000	\$10,000	\$10,000
Five Year Site Review	Every 5 years	1	lump sum	\$40,000	\$60,000	\$40,000	\$60,000
Groundwater Monitoring							
Analytical/Reporting	Year 1 - 30	1	year	\$70,000	\$151,000	\$70,000	\$151,000
Containment							
Cover Maintenance	Year 12 - 30	1	lump sum	\$30,000	\$50,000	\$30,000	\$50,000
Treatment and Disposal							
Soil							
Excavation/Backfill	Year 1 - 10	29,700	cu. yd.	\$17	\$75	\$500,000	\$2,230,000
Dewatering removed soils	Year 1 - 10	11,400	cu. yd.	\$3	\$20	\$34,000	\$228,000
Bioremediation	Year 1 - 10	21,200	cu. yd.	\$26	\$34	\$547,000	\$725,000
Groundwater							
Bioreactor	Year 1 - 30	72,580	1,000 gallons	\$7	\$14	\$510,000	\$1,033,000
Oily Wastes and Sludge							
Off-Site Incineration	Year 2 - 30	3,300	gallon	\$17	\$26	\$58,800	\$92,400
Annual cost for year 1						\$1,680,000	\$4,390,000
Annual cost for years 2 - 10						\$1,740,000	\$4,480,000
Annual cost for year 11						\$657,000	\$1,298,000
Annual cost for years 12 - 30						\$687,000	\$1,348,000

PRESENT WORTH

Duration 30 years
Discount rate 5 percent

\$30,200,000 \$64,100,000

PRESENT WORTH - 5 Percent
(58 - Min.)

YEAR	CAPITAL COSTS	ORM COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$11,221,300	\$0	\$11,221,300	1.000	\$11,221,300	\$11,221,300
1	\$0	\$1,680,000	\$1,680,000	0.952	\$1,600,000	\$12,821,300
2	\$0	\$1,740,000	\$1,740,000	0.907	\$1,578,231	\$14,399,531
3	\$0	\$1,740,000	\$1,740,000	0.864	\$1,503,077	\$15,902,609
4	\$0	\$1,740,000	\$1,740,000	0.823	\$1,431,502	\$17,334,111
5	\$0	\$1,740,000	\$1,740,000	0.784	\$1,363,336	\$18,697,447
6	\$0	\$1,740,000	\$1,740,000	0.746	\$1,298,415	\$19,995,861
7	\$0	\$1,740,000	\$1,740,000	0.711	\$1,236,586	\$21,232,447
8	\$0	\$1,740,000	\$1,740,000	0.677	\$1,177,700	\$22,410,147
9	\$0	\$1,740,000	\$1,740,000	0.645	\$1,121,620	\$23,531,767
10	\$0	\$1,740,000	\$1,740,000	0.614	\$1,068,209	\$24,599,976
11	\$868,700	\$687,000	\$1,525,700	0.585	\$892,043	\$25,492,021
12	\$0	\$687,000	\$687,000	0.557	\$382,547	\$25,874,568
13	\$0	\$687,000	\$687,000	0.530	\$364,331	\$26,238,899
14	\$0	\$687,000	\$687,000	0.505	\$346,982	\$26,585,881
15	\$0	\$687,000	\$687,000	0.481	\$330,459	\$26,916,340
16	\$0	\$687,000	\$687,000	0.458	\$314,723	\$27,231,062
17	\$0	\$687,000	\$687,000	0.436	\$299,736	\$27,530,798
18	\$0	\$687,000	\$687,000	0.416	\$285,463	\$27,816,261
19	\$0	\$687,000	\$687,000	0.396	\$271,869	\$28,088,130
20	\$0	\$687,000	\$687,000	0.377	\$258,923	\$28,347,053
21	\$0	\$687,000	\$687,000	0.359	\$246,593	\$28,593,646
22	\$0	\$687,000	\$687,000	0.342	\$234,831	\$28,828,497
23	\$0	\$687,000	\$687,000	0.326	\$223,667	\$29,052,165
24	\$0	\$687,000	\$687,000	0.310	\$213,017	\$29,265,181
25	\$0	\$687,000	\$687,000	0.295	\$202,873	\$29,468,054
26	\$0	\$687,000	\$687,000	0.281	\$193,212	\$29,661,267
27	\$0	\$687,000	\$687,000	0.268	\$184,012	\$29,845,279
28	\$0	\$687,000	\$687,000	0.255	\$175,249	\$30,020,528
29	\$0	\$687,000	\$687,000	0.243	\$166,904	\$30,187,432

30 YEAR TOTAL PRESENT WORTH

\$30,187,432

PRESENT WORTH - 5 Percent
(SH - Max.)

YEAR	CAPITAL COSTS	O&M COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$18,576,000	\$0	\$18,576,000	1.000	\$18,576,000	\$18,576,000
1	\$0	\$4,390,000	\$4,390,000	0.952	\$4,180,952	\$22,756,952
2	\$0	\$4,480,000	\$4,480,000	0.907	\$4,063,492	\$26,820,444
3	\$0	\$4,480,000	\$4,480,000	0.864	\$3,869,992	\$30,690,437
4	\$0	\$4,480,000	\$4,480,000	0.823	\$3,685,707	\$34,376,144
5	\$0	\$4,480,000	\$4,480,000	0.784	\$3,510,197	\$37,886,341
6	\$0	\$4,480,000	\$4,480,000	0.746	\$3,243,045	\$41,229,386
7	\$0	\$4,480,000	\$4,480,000	0.711	\$3,183,852	\$44,413,239
8	\$0	\$4,480,000	\$4,480,000	0.677	\$3,092,240	\$47,445,479
9	\$0	\$4,480,000	\$4,480,000	0.645	\$2,887,848	\$50,333,327
10	\$0	\$4,480,000	\$4,480,000	0.614	\$2,750,331	\$53,083,658
11	\$1,734,000	\$1,298,000	\$3,032,000	0.585	\$1,772,748	\$54,856,406
12	\$0	\$1,348,000	\$1,348,000	0.557	\$750,617	\$55,607,023
13	\$0	\$1,348,000	\$1,348,000	0.530	\$714,873	\$56,321,896
14	\$0	\$1,348,000	\$1,348,000	0.505	\$680,832	\$57,002,727
15	\$0	\$1,348,000	\$1,348,000	0.481	\$648,411	\$57,651,138
16	\$0	\$1,348,000	\$1,348,000	0.458	\$617,534	\$58,268,673
17	\$0	\$1,348,000	\$1,348,000	0.436	\$588,128	\$58,856,801
18	\$0	\$1,348,000	\$1,348,000	0.416	\$560,122	\$59,416,923
19	\$0	\$1,348,000	\$1,348,000	0.396	\$533,449	\$59,950,372
20	\$0	\$1,348,000	\$1,348,000	0.377	\$508,047	\$60,458,419
21	\$0	\$1,348,000	\$1,348,000	0.359	\$483,854	\$60,942,273
22	\$0	\$1,348,000	\$1,348,000	0.342	\$460,814	\$61,403,087
23	\$0	\$1,348,000	\$1,348,000	0.326	\$438,870	\$61,841,957
24	\$0	\$1,348,000	\$1,348,000	0.310	\$417,972	\$62,259,929
25	\$0	\$1,348,000	\$1,348,000	0.295	\$398,068	\$62,657,997
26	\$0	\$1,348,000	\$1,348,000	0.281	\$379,113	\$63,037,109
27	\$0	\$1,348,000	\$1,348,000	0.268	\$361,060	\$63,398,169
28	\$0	\$1,348,000	\$1,348,000	0.255	\$343,866	\$63,742,035
29	\$0	\$1,348,000	\$1,348,000	0.243	\$327,492	\$64,069,527

30 YEAR TOTAL PRESENT WORTH

\$64,069,527

ESTIMATED COST FOR REMEDIAL ALTERNATIVE 5B

Soil: Bioremediation (10 years)

Groundwater: Oil/Water Separation Followed by Bioremediation and Carbon Polishing

Oily Wastes and Sludge: Off-Site Incineration

Item/Description	Duration	Quantity	Unit	Unit Cost		Total Cost	
				Min.	Max.	Min.	Max.
CAPITAL COSTS							
Institutional Controls							
Implementation	1st year	1	lump sum	\$75,000	\$75,000	\$75,000	\$75,000
Groundwater Monitoring							
Well Installation	1st year	4	each	\$1,200	\$2,000	\$4,800	\$8,000
Site Preparation							
Excavate and Reconstruct Railroad	1st year	1,000	feet	\$100	\$150	\$100,000	\$150,000
Containment							
Soil Cover	11th year	51,100	cu. yd.	\$10	\$20	\$511,000	\$1,020,000
Common Borrow	1st year	10,000	cu. yd.	\$8	\$15	\$128,000	\$240,000
Treatment and Disposal							
Soil							
Fixed Costs	1st year	1	lump sum	\$2,660,000	\$6,040,000	\$2,660,000	\$6,040,000
Transportation	1st year	11,000	cu. yd.	\$4	\$8	\$44,000	\$88,000
Groundwater							
Treatment Facility	1st year	1	lump sum	\$981,000	\$1,090,000	\$981,000	\$1,090,000
Extraction Facility	1st year	1	lump sum	\$371,000	\$557,000	\$371,000	\$557,000
Infiltration Facility	1st year	1	lump sum	\$133,000	\$168,000	\$133,000	\$168,000
Oily Wastes and Sludge							
Off-Site Incineration	1st year	30,000	gallon	\$17	\$26	\$504,000	\$792,000
Equipment and Debris							
Mob/Decom/Disposal	1st year	1	lump sum	\$1,600,000	\$1,720,000	\$1,600,000	\$1,720,000
SUBTOTAL						\$7,110,000	\$11,950,000
Contractors Overhead and Profit @ 20%						\$1,420,000	\$2,390,000
Contractors Mobilization and Demobilization @ 15%						\$1,070,000	\$1,790,000
Engineering Design @ 20%						\$1,420,000	\$2,390,000
Administrative Costs @ 15%						\$1,066,500	\$1,792,500
TOTAL CAPITAL REQUIREMENT						\$12,090,000	\$20,310,000

ESTIMATED COST FOR REMEDIAL ALTERNATIVE 5B

Soil: Bioremediation (10 years)

Groundwater: Oil/Water Separation Followed by Bioremediation and Carbon Polishing

Oily Wastes and Sludges: Off-Site Incineration

Item/Description	Duration	Quantity	Unit	Unit Cost		Total Cost	
				Min.	Max.	Min.	Max.
OPERATION AND MAINTENANCE COSTS							
<i>Institutional Controls</i>							
Institutional Controls	Year 1 - 30	1	lump sum	\$10,000	\$10,000	\$10,000	\$10,000
Five Year Site Review	Every 5 years	1	lump sum	\$40,000	\$60,000	\$40,000	\$60,000
<i>Groundwater Monitoring</i>							
Analytical/Reporting	Year 1 - 30	1	year	\$70,000	\$151,000	\$70,000	\$151,000
<i>Containment</i>							
Cover Maintenance	Year 12 - 30	1	lump sum	\$30,000	\$50,000	\$30,000	\$50,000
<i>Treatment and Disposal</i>							
<i>Soil</i>							
Excavation/Backfill	Year 1 - 10	29,700	cu. yd.	\$17	\$75	\$500,000	\$2,230,000
Dewatering removed soils	Year 1 - 10	11,400	cu. yd.	\$3	\$20	\$34,000	\$228,000
Bioremediation	Year 1 - 10	21,200	cu. yd.	\$26	\$34	\$547,000	\$725,000
<i>Groundwater</i>							
Bioreactor	Year 1 - 30	72,580	1,000 gallons	\$7	\$14	\$510,000	\$1,033,000
<i>Oily Wastes and Sludge</i>							
Off-Site Incineration	Year 2 - 30	3,500	gallon	\$17	\$26	\$58,800	\$92,400
Annual cost for year 1						\$1,680,000	\$4,390,000
Annual cost for years 2 - 10						\$1,740,000	\$4,480,000
Annual cost for year 11						\$657,000	\$1,298,000
Annual cost for years 12 - 30						\$687,000	\$1,348,000

PRESENT WORTH

Duration 30 years
Discount rate 7 percent

\$27,400,000 \$77,800,000

PRESENT WORTH - 7 Percent
(\$ - Mil.)

YEAR	CAPITAL COSTS	O&M COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$11,221,300	\$0	\$11,221,300	1.000	\$11,221,300	\$11,221,300
1	\$0	\$1,580,000	\$1,580,000	0.935	\$1,570,093	\$12,791,393
2	\$0	\$1,740,000	\$1,740,000	0.873	\$1,519,783	\$14,311,177
3	\$0	\$1,740,000	\$1,740,000	0.816	\$1,420,333	\$15,731,511
4	\$0	\$1,740,000	\$1,740,000	0.763	\$1,327,438	\$17,058,973
5	\$0	\$1,740,000	\$1,740,000	0.713	\$1,240,596	\$18,299,569
6	\$0	\$1,740,000	\$1,740,000	0.666	\$1,159,433	\$19,459,004
7	\$0	\$1,740,000	\$1,740,000	0.623	\$1,083,583	\$20,542,589
8	\$0	\$1,740,000	\$1,740,000	0.582	\$1,012,696	\$21,555,285
9	\$0	\$1,740,000	\$1,740,000	0.544	\$946,445	\$22,501,729
10	\$0	\$1,740,000	\$1,740,000	0.508	\$884,528	\$23,386,257
11	\$868,700	\$657,000	\$1,525,700	0.475	\$724,849	\$24,111,106
12	\$0	\$687,000	\$687,000	0.444	\$305,036	\$24,416,142
13	\$0	\$687,000	\$687,000	0.415	\$283,081	\$24,701,223
14	\$0	\$687,000	\$687,000	0.388	\$266,430	\$24,967,653
15	\$0	\$687,000	\$687,000	0.362	\$249,000	\$25,216,654
16	\$0	\$687,000	\$687,000	0.339	\$232,711	\$25,449,365
17	\$0	\$687,000	\$687,000	0.317	\$217,487	\$25,666,851
18	\$0	\$687,000	\$687,000	0.296	\$203,259	\$25,870,110
19	\$0	\$687,000	\$687,000	0.277	\$189,961	\$26,060,071
20	\$0	\$687,000	\$687,000	0.258	\$177,534	\$26,237,605
21	\$0	\$687,000	\$687,000	0.242	\$165,919	\$26,403,524
22	\$0	\$687,000	\$687,000	0.226	\$155,065	\$26,558,589
23	\$0	\$687,000	\$687,000	0.211	\$144,921	\$26,703,510
24	\$0	\$687,000	\$687,000	0.197	\$135,440	\$26,838,949
25	\$0	\$687,000	\$687,000	0.184	\$126,579	\$26,965,529
26	\$0	\$687,000	\$687,000	0.172	\$118,298	\$27,083,827
27	\$0	\$687,000	\$687,000	0.161	\$110,559	\$27,194,386
28	\$0	\$687,000	\$687,000	0.150	\$103,326	\$27,297,712
29	\$0	\$687,000	\$687,000	0.141	\$96,567	\$27,394,279

30 YEAR TOTAL PRESENT WORTH

\$27,394,279

PRESENT WORTH - 7 Percent
(SB - Btax)

YEAR	CAPITAL COSTS	OWN COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$18,576,000	\$0	\$18,576,000	1.000	\$18,576,000	\$18,576,000
1	\$0	\$4,390,000	\$4,390,000	0.935	\$4,102,804	\$22,678,804
2	\$0	\$4,480,000	\$4,480,000	0.873	\$3,913,006	\$26,591,809
3	\$0	\$4,480,000	\$4,480,000	0.816	\$3,657,014	\$30,248,824
4	\$0	\$4,480,000	\$4,480,000	0.763	\$3,417,771	\$33,666,594
5	\$0	\$4,480,000	\$4,480,000	0.713	\$3,194,178	\$36,860,772
6	\$0	\$4,480,000	\$4,480,000	0.666	\$2,985,213	\$39,845,986
7	\$0	\$4,480,000	\$4,480,000	0.623	\$2,789,919	\$42,635,904
8	\$0	\$4,480,000	\$4,480,000	0.582	\$2,607,401	\$45,243,305
9	\$0	\$4,480,000	\$4,480,000	0.544	\$2,436,823	\$47,680,128
10	\$0	\$4,480,000	\$4,480,000	0.508	\$2,277,405	\$49,957,533
11	\$1,734,000	\$1,298,000	\$3,032,000	0.475	\$1,440,481	\$51,398,015
12	\$0	\$1,348,000	\$1,348,000	0.444	\$598,528	\$51,996,543
13	\$0	\$1,348,000	\$1,348,000	0.415	\$559,372	\$52,555,915
14	\$0	\$1,348,000	\$1,348,000	0.388	\$522,778	\$53,078,692
15	\$0	\$1,348,000	\$1,348,000	0.362	\$489,577	\$53,567,270
16	\$0	\$1,348,000	\$1,348,000	0.339	\$456,614	\$54,023,884
17	\$0	\$1,348,000	\$1,348,000	0.317	\$426,742	\$54,450,626
18	\$0	\$1,348,000	\$1,348,000	0.296	\$398,825	\$54,849,451
19	\$0	\$1,348,000	\$1,348,000	0.277	\$372,733	\$55,222,184
20	\$0	\$1,348,000	\$1,348,000	0.258	\$348,349	\$55,570,533
21	\$0	\$1,348,000	\$1,348,000	0.242	\$325,560	\$55,896,092
22	\$0	\$1,348,000	\$1,348,000	0.226	\$304,261	\$56,200,354
23	\$0	\$1,348,000	\$1,348,000	0.211	\$284,356	\$56,484,710
24	\$0	\$1,348,000	\$1,348,000	0.197	\$265,754	\$56,750,464
25	\$0	\$1,348,000	\$1,348,000	0.184	\$248,368	\$56,998,832
26	\$0	\$1,348,000	\$1,348,000	0.172	\$232,120	\$57,230,951
27	\$0	\$1,348,000	\$1,348,000	0.161	\$216,934	\$57,447,885
28	\$0	\$1,348,000	\$1,348,000	0.150	\$202,742	\$57,650,627
29	\$0	\$1,348,000	\$1,348,000	0.141	\$189,479	\$57,840,106

30 YEAR TOTAL PRESENT WORTH

\$57,840,106

TOTAL P.20

Montana Pole and Treating Plant Site
Proposed Alternative

Submittal
provided by PRP
group (ARCO, BN,
& Inland) at August
31, 1993 meeting.

CURRENT SITE CONDITIONS

Nature and Extent of Contamination

- * Soils contaminated from surface sources in the plant process area and along the historic drainage ditch, and isolated "hot spots" identified during remedial investigations, as depicted on Figure 1.
- Soils contaminated from LNAPL migration at the water table beneath overlying clean" soils, the interstate highway, EPA's new water treatment plant and active rail lines.
- Sludges, oily wastes and debris currently stored on site which were generated during implementation of previous removal actions. Dismantled plant equipment from the former MPTP.
- Dissolved PCP in groundwater at concentrations in excess of preliminary remediation action goals (PRAGS) established in the Final FS Report.

Past and Current Removal Activities

- EPA's action beginning in 1985 involved removal of 10,000 cu. yd. of contaminated soils which are currently stored on site awaiting treatment.
- EPA's actions between 1985 and 1992 recovered approximately 21,000 gallons of free product and generated sludges (from KPEG treatment of oily wastes) which are currently being stored on the site (per telephone conversation between Phyllis Flack and Sara Weinstock on August 25, 1993).
- EPA's 1992/1993 recovery system designed to address LNAPL via a pump and treat system began recovering free product in March 1993. Reportedly this system has been recovering approximately 1000 gallons of LNAPL per month (per telephone conversation between Phyllis Flack and Sara Weinstock on August 25, 1993).
- Permanent groundwater treatment plant installed in 1992 by EPA and put into operation in January 1993 - Granular activated carbon system was designed to remove dissolved PCP from groundwater to levels suitable for discharge to Silver Bow Creek. Currently approximately 150 gallons of groundwater are treated and discharged from the plant per minute (reported by Sara Weinstock during telephone conversation with Phyllis Flack on August 25, 1993).

Near creek soils contaminated by oil seeps will also be addressed by EPA, as described in the EE/CA (EPA, June 29, 1993) - This removal work is reportedly anticipated to

commence on or about the first week in October 1993 (per telephone conversation between C. Doris / S. Weinstock and S. Purdy on August 18, 1993). Total excavation volumes for this removal action are estimated at 11,000 cu yd. Only 4,000 cu yd of the excavated materials are expected to require treatment for PCP removal and the remaining 7,000 cu yd would be clean overburden material, which would be backfilled at the site. The 4,000 cu yd of contaminated soils requiring treatment will be stockpiled on site and treated with other previously excavated soils during remedial action.

Institutional Controls

Based on current and future Butte-Silver Bow (B-SB) zoning and ordinance restrictions and private party land use controls, future land uses at the site can include a recreational park, commercial development along Greenwood Avenue, open space areas and coordination/integration of planned future uses of LAO.

Proposed Remedy Description

Soils/LNAPL

- Excavate all accessible surface soils with PCP concentrations exceeding applicable standards established for future land use scenarios. For the purpose of calculating volumes and cost analyses, PRAGs set forth in the Final FS Report (for occupational/industrial/recreational land use scenarios) were used to delineate surface excavation areas shown on Figure 1.
- Excavate accessible subsurface soils with PCP concentrations exceeding acceptable standards established for future land use scenarios. Only those contaminated soils underlying contaminated surficial soils are proposed for excavation. For the purpose of calculating volumes and cost analyses, PRAGs set forth in the Final FS Report (for occupational/industrial/recreational land use scenarios) were used to delineate areas with subsurface contamination to a total depth approximately 1 foot above the water table, or as close to the water table as possible for efficient equipment operation and mobility, as shown in Figure 1.

Estimate of Total Volume to be Excavated under proposed alternative, calculated as noted above is:

- Surface and Subsurface soils south of I-15/90 = 42,900 cu yd - Surface and Subsurface soils north of I-15/90 = 12,200 cu yd - Identified "hot spots" = 1,000 cu yd (assumes 3' removal depth)

Approximate TOTAL volume to be excavated under preferred alternative (does not include soils being addressed in other actions at the site) = 56,100 cu yd.

- Approximate volume of contaminated soils to be treated exsitu under proposed

alternative, calculated as noted above:

- 56,100 cu yd of excavated materials, from areas described above
 - 10,000 cu yd bagged soils excavated by EPA
 - 4,000 cu yd near creek soils to be excavated under EPA's EE/CA in 1993
- Approximate TOTAL volume to be treated using surface landfarming or modified biotreatment = 70,100 cu yd**

- All soils excavated and treated using surface landfarming and/or modified biotreatment will be backfilled on the site, graded to final contours and revegetated, or covered with suitable material compatible with existing or future land uses.
- * All remaining accessible soils contaminated by LNAPL will be addressed insitu by the following methods:
 - Free product recovery via wells using existing EPA wells and any supplemental wells, as appropriate to address LNAPL in areas not excavated under the above scenario.
 - Insitu biotreatment of LNAPL contaminated soils exposed at the base of area to be excavated to approximately 1 foot above the water table (or as close as practical). Currently, we anticipate that biotreatment would involve nutrient addition via irrigation, and tilling on routine intervals (minimum frequency monthly from April to October) to a depth of 1-4 feet. Penetration depth will be dependent on equipment used for tilling. Acreages to be addressed in this manner include 1.5 Ac north of the Interstate highway and 2.5 Ac south of the Interstate.

Groundwater

Groundwater with dissolved PCP concentrations above applicable standards for an occupational/industrial land use scenario will be addressed in the following manner:

- B-SB will implement a groundwater well ban within the known area of PCP exceedances on and adjacent to the site. The groundwater well exclusion area will be surrounded by a buffer zone which will be specifically determined within the next year.
- Groundwater containing dissolved PCP concentrations in excess of applicable standards for an occupational/industrial land use scenario will be hydrologically contained within the area of the B-SB well ban using wells installed for LNAPL recovery or any supplemental wells as appropriate.

Produced groundwater will be treated in EPAs existing GAC water treatment plant. Treated groundwater will be used to enhance insitu bioremediation in excavated areas or will be discharged into Silver Bow Creek in compliance with

applicable standards. Pretreatment of PCP contaminated groundwater using a bioreactor will be evaluated during remedial design to determine if long term O & M costs of the GAC plant can be reduced.

Groundwater monitoring will be conducted upgradient of the site, at a point of compliance (to be determined), and at 4 other sites surrounding the groundwater well ban area to determine that site contaminants are not migrating beyond the groundwater well exclusion boundary. Groundwater will be monitored at these 6 locations quarterly for the first two years, semi-annually for the next 3 years (years 3 through 5) and annually thereafter for up to 30 years.

Other Media

Other media identified, such as sludges, oils and contaminated equipment/debris will be treated as described in the Final FS Report for Alternatives 3 through 5.

Alternative Analysis

Protection of Human Health and the Environment

- * All accessible contaminated surface soils with concentrations of PCP in excess of applicable based standards established in the ROD (for occupational/industrial/recreational land uses) will be removed and treated under the proposed alternative.
- Any threats to surface water are to be remediated by removing near creek soils under EPAs EE/CA. This media will be protected in the long-term by removing LNAPL through the proposed insitu well recovery methods and insitu biological treatment.
- Private party land use controls, groundwater well bans and future county zoning ordinances will prohibit future residential development of the site. ARCO, BN, B-SB and Inland Properties, Inc. will be providing written assurances to the agencies that potential future site uses could include only industrial/commercial development, open space and recreational uses.
- The proposed alternative is protective of human health and the environment, since all exposure pathways that can reasonably be expected to occur at the site under current and future land uses are either addressed or eliminate.

Compliance with ARARs

- ARARs are not provided for soils in the Final FS Report. Appropriate action levels should be based on the risk posed for anticipated land use conditions (i.e. recreational and occupational). All surficial soils with concentrations of PCP exceeding the PRAGs set forth in the Final FS Report are proposed for removal to minimize any potential for human exposure.
- Any treated water discharges to Silver Bow Creek will meet established ARARs for PCP.
- Naturally occurring groundwater discharge to Silver Bow Creek will be minimized by the use of hydrologic controls and source removals on site, to limit any exceedances of standards for PCP in the stream.
- MCLs for groundwater should not be ARARs within the groundwater well ban zone (area established by B-SB), since this restriction will prohibit future groundwater development at the site for potable uses.

Long-Term Effectiveness and Permanence

- The proposed alternative provides long-term effectiveness and permanence by removing all accessible soils above groundwater contaminated by PCP at levels exceeding the PRAGs set forth in the Final FS Report. In addition, LNAPL contaminated soils will be treated by in-situ removal using either recovery wells or biological treatment.
- Hydrologic controls will be maintained on the site to assure containment of site groundwater.
- Long-term groundwater monitoring will be conducted to assess the effectiveness of groundwater containment at the site.
- Restriction of future land uses will permanently prohibit any development which would alter or disturb any remedial activities occurring on the site.
- The proposed remedy is consistent with EPA's removal actions initiated in 1992, and maximizes the use of all newly constructed permanent facilities and equipment.

Reduction of Toxicity, Mobility and Volume

- The proposed alternative reduces toxicity by removing all accessible contaminated soils (within specified concentration levels) above groundwater and provides for insitu removal of contaminants from soils below the water table to the maximum extent practicable using recovery wells and insitu biological treatment.

- Mobility of contaminants is reduced under the proposed alternative because accessible source areas will be removed and other LNAPL will be removed (to the maximum extent practicable) from soils beneath the water table using the best available insitu technologies, including innovative technologies.
- The volume of contaminants at the site will be reduced by removing and treating all accessible soils (with concentrations of PCP in excess of applicable standards for allowable future land uses) above the water table; providing insitu removal of LNAPL to the maximum extent practicable from contaminated soils at the water table using recovery wells and biological treatment; removing dissolved PCP from groundwater extracted while implementing hydrologic controls at the site.

Implementability

- In areas proposed for excavation under the proposed alternative, the remedy utilizes proven effective technologies which pose minimal potential for failure during implementation. Uncertainties associated with excavation beneath the water table are eliminated, with insitu treatment of LNAPL contaminated soils.
- The proposed remedy addresses concerns for recontamination of "clean" backfilled soils north of the interstate from inaccessible soils beneath the interstate and EPA's groundwater treatment plant, since the "clean" materials are not expected to come into contact with the LNAPL layer (as the LNAPL layer will be treated using insitu biological treatment in excavated areas prior to backfilling with clean soils and in other areas, insitu product recovery using wells will be implemented to address migration of LNAPL from inaccessible areas).
- Insitu LNAPL removal eliminates the need for excavation of "clean" overlying soils in a large portion of the site, thus reducing the time required for remedy implementation and minimizing concerns regarding cross-contamination. Since excavation time is reduced, the potential for accidents and human health or environmental risks during remedy implementation are reduced.

Short Term Effectiveness

- The proposed alternative minimizes the short-term potential for adverse health effects from human exposure by restricting site use and access during remedial activities. The LNAPL layer will not be exposed on the surface since excavation ceases at a depth one foot above the water table and these materials will be treated insitu. The area(s) proposed for insitu biological treatment will be exposed for much shorter time periods than the time required to expose the identified LNAPL under Alternative 5B, thus minimizing the potential for short term exposure in these areas.

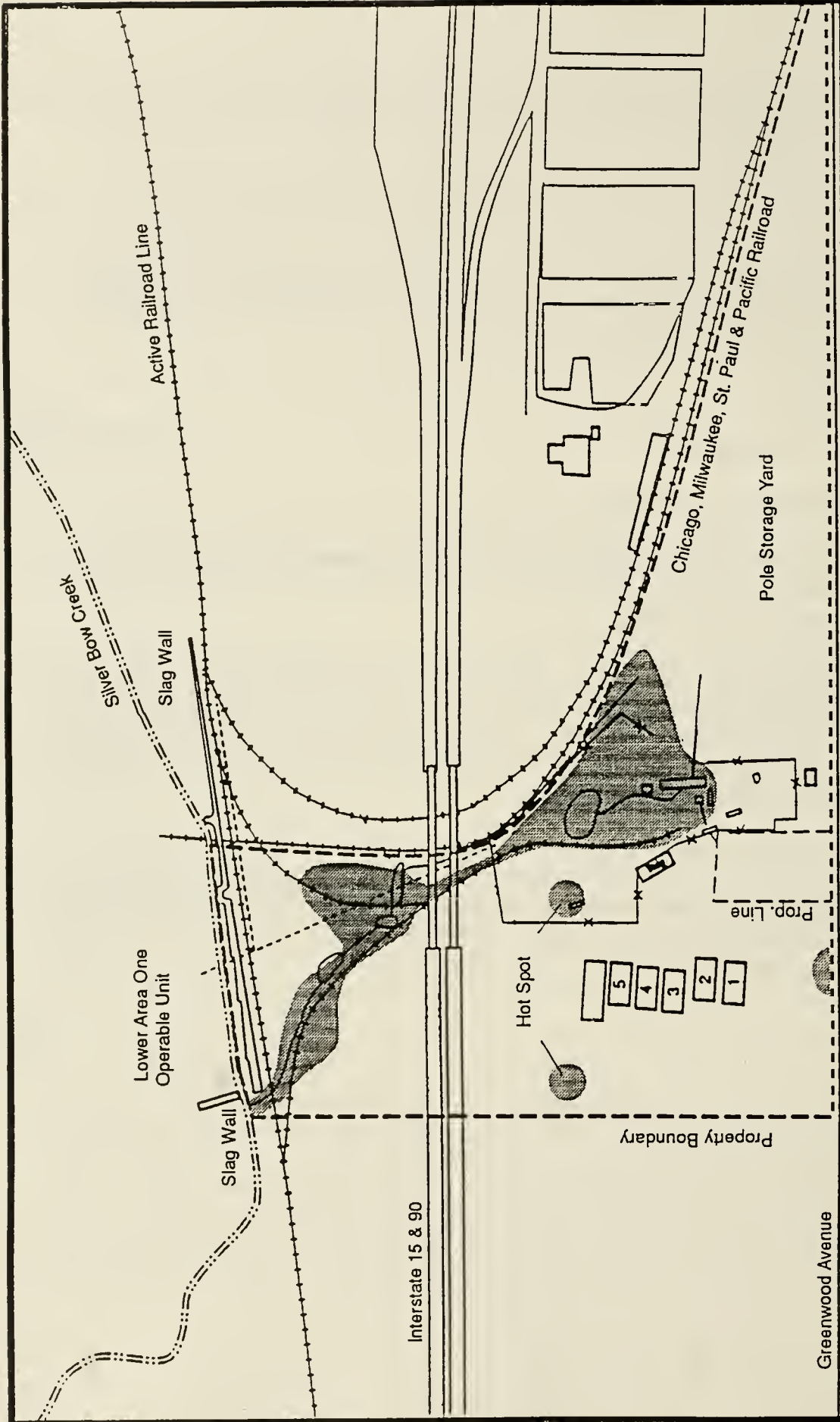
- LNAPL on the water table will not be exposed during remedial activities, therefore potential adverse impacts to wildlife, waterfowl, other ecosystems, as well as humans are minimized.
- The proposed remedy uses all facilities and equipment installed by the EPA in 1992, and there would be no interruption of the operation of those facilities.
- The proposed alternative restores the site to conditions consistent with future private and community land uses within the shortest time possible, while optimizing contaminant recovery/removal from the site.

Costs

Costs for implementation of the proposed alternative are provided in the attached tables.

Community Acceptance

- The proposed alternative allows for site soil excavation and treatment of removed materials to occur in an expeditious manner, consistent with community desires (approximately 5 years).
- Activities associated with insitu product recovery from contaminated soils at the water table, and groundwater treatment for water produced from hydrologic controls will continue beyond the time required for remediating excavated soils; however any structures or facilities associated with these efforts will be compatible with future land uses for the site.
- Implementation of the proposed remedy will allow future land uses which are consistent with future land use plans for LAO, commercial development along Greenwood Avenue, existing and future industrial development, and open space recreational areas.



LEGEND

- +--- Railroad Tracks
- Creek
- X--- Fence
- Site Boundary
- Sewer Line

Site Features as of 1990



Mount Moriah Cemetery

Montana Pole
Treatment Plant

Soil Excavation Area

8-25-93

Figure 1

ESTIMATED COST FOR PREFERRED ALTERNATIVE

Montana Pole and Treating Plant NPL Site

(Total Cost)

Soil: Bioremediation (5 years)

Groundwater: Oil/Water Separation Followed by Carbon Adsorption

Oily Wastes and Sludge: Off-Site Incineration

Item/Description	Duration	Quantity	Unit	Unit Cost		Total	Cost
				Min.	Max.	Min.	Max.
CAPITAL COSTS							
Institutional Controls							
Implementation	1st year	1	lump sum	\$75,000	\$75,000	\$75,000	\$75,000
Groundwater Monitoring							
Well Installation	1st year	5	each	\$1,200	\$2,000	\$6,000	\$10,000
Treatment and Disposal							
Soil							
Fixed Costs	1st year	.1	lump sum	\$1,570,000	\$6,040,000	\$1,570,000	\$6,040,000
Transportation	2nd year	4,000	cu. yd.	\$4	\$8	\$16,000	\$32,000
Groundwater							
Well Installation	1st year	5	each	\$1,200	\$2,000	\$6,000	\$10,000
Well Installation	3rd year	4	each	\$1,200	\$2,000	\$5,000	\$8,000
Well Installation	8th year	2	each	\$1,200	\$2,000	\$2,000	\$4,000
Oily Wastes and Sludge							
Off-Site Incineration	1st year	30,000	gallon	\$17	\$26	\$510,000	\$780,000
Equipment and Debris							
Mob/Decon/Disposal	1st year	1	lump sum	\$1,600,000	\$1,720,000	\$1,600,000	\$1,720,000
Subtotal						\$3,790,000	\$8,679,000
Engineering Design at 20 Percent						\$758,000	\$1,735,800
Administrative Costs at 15 Percent						\$568,500	\$1,301,850
TOTAL CAPITAL REQUIREMENT						\$5,116,500	\$11,716,650

ESTIMATED COST FOR PREFERRED ALTERNATIVE (Continued)
Montana Pole and Treating Plant NPL Site
(Total Cost)

Soil: Bioremediation (3 years)

Groundwater: Oil/Water Separation Followed by Carbon Adsorption

Oily Wastes and Sludge: Off-Site Incineration

Item/Description	Duration	Quantity	Unit	Unit Cost		Total Cost	
				Min.	Max.	Min.	Max.
OPERATION AND MAINTENANCE COSTS							
Institutional Controls							
Institutional Controls	Year 1 - 30	1	lump sum	\$10,000	\$10,000	\$300,000	\$300,000
Five Year Site Review	Every 5 years	1	lump sum	\$40,000	\$60,000	\$240,000	\$360,000
Groundwater Monitoring							
Analytical	Year 1 and 2	36	samples/yr	\$250	\$350	\$18,000	\$25,200
Mob/Reporting	Years 1 and 2	4	lump sum	\$25,000	\$30,000	\$200,000	\$240,000
Analytical	Years 3, 4, 5	18	samples/yr	\$250	\$350	\$13,500	\$18,900
Mob/Reporting	Years 3, 4, 5	2	lump sum	\$25,000	\$30,000	\$150,000	\$180,000
Analytical	Year 6 - 30	9	samples/yr	\$250	\$350	\$56,250	\$78,750
Mob/Reporting	Year 6 - 30	1	lump sum	\$25,000	\$30,000	\$625,000	\$750,000
Treatment and Disposal							
Soil							
Excavation/Backfill	Year 1 - 5	11,220	cu. yd.	\$17	\$30	\$953,700	\$1,683,000
Bioremediation	Year 1 - 5	14,020	cu. yd.	\$10	\$50	\$701,000	\$3,505,000
In Situ Bioremediation	Year 1 - 5	1	lump sum	\$30,000	\$60,000	\$150,000	\$300,000
Soil Cover	Year 6	10,600	cu. yd.	\$0	\$19	\$0	\$201,400
Revegetation	Year 6	196	1000 sq. ft.	\$0	\$39	\$0	\$7,645
Groundwater							
Carbon Adsorption	Year 1 - 30	72,580	1,000 gallons	\$5	\$10	\$10,887,000	\$21,774,000
Oily Wastes and Sludge							
Off-Site Incineration	Year 2 - 10	3,500	gallon	\$17	\$26	\$535,500	\$819,000
TOTAL O&M COSTS						\$14,829,950	\$30,242,895
TOTAL COSTS						\$19,946,450	\$41,959,545

ESTIMATED COST FOR PREFERRED ALTERNATIVE

Montana Pole and Treating Plant NPL Site

(Present Worth)

Soil: Bioremediation (5 years)

Groundwater: Oil/Water Separation Followed by Carbon Adsorption

Oily Wastes and Sludge: Off-Site Incineration

Item/Description	Duration	Quantity	Unit	Unit Cost		Total Cost	
				Min.	Max.	Min.	Max.
CAPITAL COSTS							
<i>Institutional Controls</i>							
Implementation	1st year	1	lump sum	\$75,000	\$75,000	\$75,000	\$75,000
<i>Groundwater Monitoring</i>							
Well Installation	1st year	5	each	\$1,200	\$2,000	\$6,000	\$10,000
<i>Treatment and Disposal</i>							
Soil							
Fixed Costs	1st year	1	lump sum	\$1,570,000	\$6,040,000	\$1,570,000	\$6,040,000
Transportation	2nd year	4,000	cu. yd.	\$4	\$8	\$16,000	\$32,000
Groundwater							
Well Installation	1st year	5	each	\$1,200	\$2,000	\$6,000	\$10,000
Well Installation	3rd year	4	each	\$1,200	\$2,000	\$5,000	\$8,000
Well Installation	8th year	2	each	\$1,200	\$2,000	\$2,000	\$4,000
Oily Wastes and Sludge							
Off-Site Incineration	1st year	30,000	gallon	\$17	\$26	\$510,000	\$780,000
Equipment and Debris							
Mob/Decon/Disposal	1st year	1	lump sum	\$1,600,000	\$1,720,000	\$1,600,000	\$1,720,000

TOTAL CAPITAL REQUIREMENT

Year 1 (Includes Adjustment of 20% for Engineering Design and 15% for Administrative Costs)

\$5,085,450

\$11,657,250

Year 2 (Includes Adjustment of 20% for Engineering Design and 15% for Administrative Costs)

\$21,600

\$43,200

Year 3 (Includes Adjustment of 20% for Engineering Design and 15% for Administrative Costs)

\$6,750

\$10,800

Year 8 (Includes Adjustment of 20% for Engineering Design and 15% for Administrative Costs)

\$2,700

\$5,400

TOTAL

\$5,116,500

\$11,716,650

ESTIMATED COST FOR PREFERRED ALTERNATIVE (Continued)
Montana Pole and Treating Plant NPL Site
(Present Worth)

Soil: Bioremediation (5 years)

Groundwater: Oil/Water Separation Followed by Carbon Adsorption

Oily Wastes and Sludge: Off-Site Incineration

Item/Description	Duration	Quantity	Unit	Unit Cost		Total Annual Cost	
				Min.	Max.	Min.	Max.
OPERATION AND MAINTENANCE COSTS							
Institutional Controls							
Institutional Controls	Year 1 - 30	1	lump sum	\$10,000	\$10,000	\$10,000	\$10,000
Five Year Site Review	Every 5 years	1	lump sum	\$40,000	\$60,000	\$40,000	\$60,000
Groundwater Monitoring							
Analytical	Year 1 and 2	36	samples/yr	\$250	\$350	\$9,000	\$12,600
Mob/Reporting	Years 1 and 2	4	lump sum	\$25,000	\$30,000	\$100,000	\$120,000
Analytical	Years 3, 4, 5	18	samples/yr	\$250	\$350	\$4,500	\$6,300
Mob/Reporting	Years 3, 4, 5	2	lump sum	\$25,000	\$30,000	\$50,000	\$60,000
Analytical	Year 6 - 30	9	samples/yr	\$250	\$350	\$2,250	\$3,150
Mob/Reporting	Year 6 - 30	1	lump sum	\$25,000	\$30,000	\$25,000	\$30,000
Treatment and Disposal							
Soil							
Excavation/Backfill	Year 1 - 5	11,220	cu. yd.	\$17	\$30	\$191,000	\$337,000
Bioremediation	Year 1 - 5	14,020	cu. yd.	\$10	\$50	\$140,000	\$701,000
In Situ Bioremediation	Year 1 - 5	1	lump sum	\$30,000	\$60,000	\$30,000	\$60,000
Soil Cover	Year 6	10,600	cu. yd.	\$0	\$19	\$0	\$201,400
Revegetation	Year 6	196	1000 sq. ft	\$0	\$39	\$0	\$7,645
Groundwater							
Carbon Adsorption	Year 1 - 30	72,580	1,000 gallons	\$5	\$10	\$360,000	\$730,000
Oily Wastes and Sludge							
Off-Site Incineration	Year 2 - 10	3,500	gallon	\$17	\$26	\$59,500	\$91,000
Annual cost for year 1						\$840,000	\$1,971,000
Annual cost for year 2						\$900,000	\$2,062,000
Annual cost for years 3 and 4						\$845,000	\$1,995,000
Annual cost for year 5						\$885,000	\$2,055,000
Annual cost for year 6						\$457,000	\$1,073,000
Annual cost for years 7, 8, and 9						\$457,000	\$864,000
Annual cost for years 10,15, 20, 25, 30						\$437,000	\$833,000
Annual cost for remaining years						\$379,000	\$753,000

PRESENT WORTH

Duration	30 years		
Discount rate	7 percent	\$12,070,000	\$26,750,000
Discount Rate	5 percent	\$13,370,000	\$29,370,000
Discount Rate	3 percent	\$15,170,000	\$33,010,000

PRESENT WORTH - 3 Percent
(Preferred Alternative - Min.)

YEAR	CAPITAL COSTS	O&M COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$5,085,450		\$5,085,450	1.000	\$5,085,450	\$5,085,450
1	\$21,600	\$840,000	\$861,600	0.971	\$836,505	\$5,921,955
2	\$6,750	\$900,000	\$906,750	0.943	\$854,699	\$6,776,654
3	\$0	\$845,000	\$845,000	0.915	\$773,295	\$7,549,948
4	\$0	\$845,000	\$845,000	0.888	\$750,772	\$8,300,720
5	\$0	\$885,000	\$885,000	0.863	\$763,409	\$9,064,129
6	\$0	\$457,000	\$457,000	0.837	\$382,730	\$9,446,859
7	\$2,700	\$457,000	\$459,700	0.813	\$373,778	\$9,820,637
8	\$0	\$457,000	\$457,000	0.789	\$360,760	\$10,181,397
9	\$0	\$457,000	\$457,000	0.766	\$350,252	\$10,531,650
10	\$0	\$437,000	\$437,000	0.744	\$325,169	\$10,856,819
11	\$0	\$379,000	\$379,000	0.722	\$273,798	\$11,130,616
12	\$0	\$379,000	\$379,000	0.701	\$265,823	\$11,396,439
13	\$0	\$379,000	\$379,000	0.681	\$258,081	\$11,654,520
14	\$0	\$379,000	\$379,000	0.661	\$250,564	\$11,905,084
15	\$0	\$437,000	\$437,000	0.642	\$280,494	\$12,185,577
16	\$0	\$379,000	\$379,000	0.623	\$236,180	\$12,421,757
17	\$0	\$379,000	\$379,000	0.605	\$229,301	\$12,651,059
18	\$0	\$379,000	\$379,000	0.587	\$222,623	\$12,873,681
19	\$0	\$379,000	\$379,000	0.570	\$216,138	\$13,089,820
20	\$0	\$437,000	\$437,000	0.554	\$241,956	\$13,331,776
21	\$0	\$379,000	\$379,000	0.538	\$203,731	\$13,535,507
22	\$0	\$379,000	\$379,000	0.522	\$197,797	\$13,733,304
23	\$0	\$379,000	\$379,000	0.507	\$192,036	\$13,925,341
24	\$0	\$379,000	\$379,000	0.492	\$186,443	\$14,111,783
25	\$0	\$437,000	\$437,000	0.478	\$208,714	\$14,320,497
26	\$0	\$379,000	\$379,000	0.464	\$175,740	\$14,496,237
27	\$0	\$379,000	\$379,000	0.450	\$170,622	\$14,666,859
28	\$0	\$379,000	\$379,000	0.437	\$165,652	\$14,832,511
29	\$0	\$379,000	\$379,000	0.424	\$160,827	\$14,993,338
30	\$0	\$437,000	\$437,000	0.412	\$180,038	\$15,173,377

30 YEAR TOTAL PRESENT WORTH

\$15,173,377

PRESENT WORTH - 5 Percent
(Preferred Alternative - Min.)

YEAR	CAPITAL COSTS	O&M COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$5,085,450		\$5,085,450	1.000	\$5,085,450	\$5,085,450
1	\$21,600	\$840,000	\$861,600	0.952	\$811,571	\$5,906,021
2	\$6,750	\$900,000	\$906,750	0.907	\$822,449	\$6,728,470
3	\$0	\$845,000	\$845,000	0.864	\$729,943	\$7,458,413
4	\$0	\$845,000	\$845,000	0.823	\$695,184	\$8,153,597
5	\$0	\$885,000	\$885,000	0.784	\$693,421	\$8,847,017
6	\$0	\$457,000	\$457,000	0.746	\$341,020	\$9,188,038
7	\$2,700	\$457,000	\$459,700	0.711	\$326,700	\$9,514,738
8	\$0	\$457,000	\$457,000	0.677	\$309,316	\$9,824,054
9	\$0	\$457,000	\$457,000	0.645	\$294,586	\$10,118,640
10	\$0	\$437,000	\$437,000	0.614	\$268,280	\$10,386,920
11	\$0	\$379,000	\$379,000	0.585	\$221,593	\$10,608,513
12	\$0	\$379,000	\$379,000	0.557	\$211,041	\$10,819,555
13	\$0	\$379,000	\$379,000	0.530	\$200,992	\$11,020,547
14	\$0	\$379,000	\$379,000	0.505	\$191,421	\$11,211,967
15	\$0	\$437,000	\$437,000	0.481	\$210,204	\$11,422,172
16	\$0	\$379,000	\$379,000	0.458	\$173,624	\$11,595,796
17	\$0	\$379,000	\$379,000	0.436	\$165,356	\$11,761,153
18	\$0	\$379,000	\$379,000	0.416	\$157,482	\$11,918,635
19	\$0	\$379,000	\$379,000	0.396	\$149,983	\$12,068,618
20	\$0	\$437,000	\$437,000	0.377	\$164,701	\$12,233,319
21	\$0	\$379,000	\$379,000	0.359	\$136,039	\$12,369,358
22	\$0	\$379,000	\$379,000	0.342	\$129,561	\$12,498,919
23	\$0	\$379,000	\$379,000	0.326	\$123,392	\$12,622,311
24	\$0	\$379,000	\$379,000	0.310	\$117,516	\$12,739,826
25	\$0	\$437,000	\$437,000	0.295	\$129,047	\$12,868,874
26	\$0	\$379,000	\$379,000	0.281	\$106,590	\$12,975,464
27	\$0	\$379,000	\$379,000	0.268	\$101,515	\$13,076,978
28	\$0	\$379,000	\$379,000	0.255	\$96,680	\$13,173,659
29	\$0	\$379,000	\$379,000	0.243	\$92,077	\$13,265,736
30	\$0	\$437,000	\$437,000	0.231	\$101,112	\$13,366,847

30 YEAR TOTAL PRESENT WORTH

\$13,366,847

PRESENT WORTH - 7 Percent
(Preferred Alternative - Min.)

YEAR	CAPITAL COSTS	O&M COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$5,085,450	\$0	\$5,085,450	1.000	\$5,085,450	\$5,085,450
1	\$21,600	\$840,000	\$861,600	0.935	\$805,234	\$5,890,684
2	\$6,750	\$900,000	\$906,750	0.873	\$791,991	\$6,682,674
3	\$0	\$845,000	\$845,000	0.816	\$689,772	\$7,372,446
4	\$0	\$845,000	\$845,000	0.763	\$644,646	\$8,017,092
5	\$0	\$885,000	\$885,000	0.713	\$630,993	\$8,648,085
6	\$0	\$457,000	\$457,000	0.666	\$304,518	\$8,952,604
7	\$2,700	\$457,000	\$459,700	0.623	\$286,278	\$9,238,882
8	\$0	\$457,000	\$457,000	0.582	\$265,978	\$9,504,860
9	\$0	\$457,000	\$457,000	0.544	\$248,578	\$9,753,437
10	\$0	\$437,000	\$437,000	0.508	\$222,149	\$9,975,586
11	\$0	\$379,000	\$379,000	0.475	\$180,060	\$10,155,646
12	\$0	\$379,000	\$379,000	0.444	\$168,281	\$10,323,927
13	\$0	\$379,000	\$379,000	0.415	\$157,272	\$10,481,198
14	\$0	\$379,000	\$379,000	0.388	\$146,983	\$10,628,181
15	\$0	\$437,000	\$437,000	0.362	\$158,389	\$10,786,570
16	\$0	\$379,000	\$379,000	0.339	\$128,380	\$10,914,950
17	\$0	\$379,000	\$379,000	0.317	\$119,982	\$11,034,932
18	\$0	\$379,000	\$379,000	0.296	\$112,132	\$11,147,065
19	\$0	\$379,000	\$379,000	0.277	\$104,797	\$11,251,861
20	\$0	\$437,000	\$437,000	0.258	\$112,929	\$11,364,790
21	\$0	\$379,000	\$379,000	0.242	\$91,533	\$11,456,324
22	\$0	\$379,000	\$379,000	0.226	\$85,545	\$11,541,869
23	\$0	\$379,000	\$379,000	0.211	\$79,949	\$11,621,818
24	\$0	\$379,000	\$379,000	0.197	\$74,719	\$11,696,536
25	\$0	\$437,000	\$437,000	0.184	\$80,517	\$11,777,053
26	\$0	\$379,000	\$379,000	0.172	\$65,262	\$11,842,315
27	\$0	\$379,000	\$379,000	0.161	\$60,993	\$11,903,308
28	\$0	\$379,000	\$379,000	0.150	\$57,002	\$11,960,310
29	\$0	\$379,000	\$379,000	0.141	\$53,273	\$12,013,584
30	\$0	\$437,000	\$437,000	0.131	\$57,407	\$12,070,991

30 YEAR TOTAL PRESENT WORTH

\$12,070,991

PRESENT WORTH - 3 Percent
(Preferred Alternative - Max.)

YEAR	CAPITAL COSTS	O&M COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$11,657,250	\$0	\$11,657,250	1.000	\$11,657,250	\$11,657,250
1	\$43,200	\$1,971,000	\$2,014,200	0.971	\$1,955,534	\$13,612,784
2	\$10,800	\$2,062,000	\$2,072,800	0.943	\$1,953,813	\$15,566,597
3	\$0	\$1,995,000	\$1,995,000	0.915	\$1,825,708	\$17,392,304
4	\$0	\$1,995,000	\$1,995,000	0.888	\$1,772,532	\$19,164,836
5	\$0	\$2,055,000	\$2,055,000	0.863	\$1,772,661	\$20,937,497
6	\$0	\$1,073,000	\$1,073,000	0.837	\$898,621	\$21,836,118
7	\$5,400	\$864,000	\$869,400	0.813	\$706,902	\$22,543,019
8	\$0	\$864,000	\$864,000	0.789	\$682,050	\$23,225,069
9	\$0	\$864,000	\$864,000	0.766	\$662,184	\$23,887,253
10	\$0	\$833,000	\$833,000	0.744	\$619,830	\$24,507,083
11	\$0	\$753,000	\$753,000	0.722	\$543,983	\$25,051,067
12	\$0	\$753,000	\$753,000	0.701	\$528,139	\$25,579,206
13	\$0	\$753,000	\$753,000	0.681	\$512,756	\$26,091,962
14	\$0	\$753,000	\$753,000	0.661	\$497,822	\$26,589,784
15	\$0	\$833,000	\$833,000	0.642	\$534,671	\$27,124,455
16	\$0	\$753,000	\$753,000	0.623	\$469,245	\$27,593,699
17	\$0	\$753,000	\$753,000	0.605	\$455,577	\$28,049,277
18	\$0	\$753,000	\$753,000	0.587	\$442,308	\$28,491,585
19	\$0	\$753,000	\$753,000	0.570	\$429,425	\$28,921,010
20	\$0	\$833,000	\$833,000	0.554	\$461,212	\$29,382,222
21	\$0	\$753,000	\$753,000	0.538	\$404,775	\$29,786,997
22	\$0	\$753,000	\$753,000	0.522	\$392,985	\$30,179,982
23	\$0	\$753,000	\$753,000	0.507	\$381,539	\$30,561,521
24	\$0	\$753,000	\$753,000	0.492	\$370,426	\$30,931,947
25	\$0	\$833,000	\$833,000	0.478	\$397,845	\$31,329,792
26	\$0	\$753,000	\$753,000	0.464	\$349,162	\$31,678,954
27	\$0	\$753,000	\$753,000	0.450	\$338,992	\$32,017,947
28	\$0	\$753,000	\$753,000	0.437	\$329,119	\$32,347,066
29	\$0	\$753,000	\$753,000	0.424	\$319,533	\$32,666,598
30	\$0	\$833,000	\$833,000	0.412	\$343,185	\$33,009,783

30 YEAR TOTAL PRESENT WORTH

\$33,009,783

PRESENT WORTH - 5 Percent
(Preferred Alternative - Max.)

YEAR	CAPITAL COSTS	O&M COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$11,657,250	\$0	\$11,657,250	1.000	\$11,657,250	\$11,657,250
1	\$43,200	\$1,971,000	\$2,014,200	0.952	\$1,918,286	\$13,575,536
2	\$10,800	\$2,062,000	\$2,072,800	0.907	\$1,880,091	\$15,455,626
3	\$0	\$1,995,000	\$1,995,000	0.864	\$1,723,356	\$17,178,982
4	\$0	\$1,995,000	\$1,995,000	0.823	\$1,641,291	\$18,820,274
5	\$0	\$2,055,000	\$2,055,000	0.784	\$1,610,146	\$20,430,420
6	\$0	\$1,073,000	\$1,073,000	0.746	\$800,689	\$21,231,109
7	\$5,400	\$864,000	\$869,400	0.711	\$617,866	\$21,848,976
8	\$0	\$864,000	\$864,000	0.677	\$584,789	\$22,433,765
9	\$0	\$864,000	\$864,000	0.645	\$556,942	\$22,990,707
10	\$0	\$833,000	\$833,000	0.614	\$511,390	\$23,502,097
11	\$0	\$753,000	\$753,000	0.585	\$440,264	\$23,942,360
12	\$0	\$753,000	\$753,000	0.557	\$419,299	\$24,361,659
13	\$0	\$753,000	\$753,000	0.530	\$399,332	\$24,760,991
14	\$0	\$753,000	\$753,000	0.505	\$380,316	\$25,141,307
15	\$0	\$833,000	\$833,000	0.481	\$400,687	\$25,541,994
16	\$0	\$753,000	\$753,000	0.458	\$344,958	\$25,886,952
17	\$0	\$753,000	\$753,000	0.436	\$328,531	\$26,215,484
18	\$0	\$753,000	\$753,000	0.416	\$312,887	\$26,528,371
19	\$0	\$753,000	\$753,000	0.396	\$297,988	\$26,826,358
20	\$0	\$833,000	\$833,000	0.377	\$313,949	\$27,140,307
21	\$0	\$753,000	\$753,000	0.359	\$270,284	\$27,410,591
22	\$0	\$753,000	\$753,000	0.342	\$257,413	\$27,668,004
23	\$0	\$753,000	\$753,000	0.326	\$245,155	\$27,913,159
24	\$0	\$753,000	\$753,000	0.310	\$233,481	\$28,146,640
25	\$0	\$833,000	\$833,000	0.295	\$245,987	\$28,392,627
26	\$0	\$753,000	\$753,000	0.281	\$211,774	\$28,604,402
27	\$0	\$753,000	\$753,000	0.268	\$201,690	\$28,806,091
28	\$0	\$753,000	\$753,000	0.255	\$192,086	\$28,998,177
29	\$0	\$753,000	\$753,000	0.243	\$182,939	\$29,181,115
30	\$0	\$833,000	\$833,000	0.231	\$192,737	\$29,373,853

30 YEAR TOTAL PRESENT WORTH

\$29,373,853

PRESENT WORTH - 7 Percent
(Preferred Alternative - Max.)

YEAR	CAPITAL COSTS	O&M COSTS	ANNUAL EXPENDITURE	DISCOUNT FACTOR	ANNUAL PRESENT WORTH	TOTAL PRESENT WORTH
0	\$11,657,250	\$0	\$11,657,250	1.000	\$11,657,250	\$11,657,250
1	\$43,200	\$1,971,000	\$2,014,200	0.935	\$1,882,430	\$13,539,680
2	\$10,800	\$2,062,000	\$2,072,800	0.873	\$1,810,464	\$15,350,144
3	\$0	\$1,995,000	\$1,995,000	0.816	\$1,628,514	\$16,978,658
4	\$0	\$1,995,000	\$1,995,000	0.763	\$1,521,976	\$18,500,634
5	\$0	\$2,055,000	\$2,055,000	0.713	\$1,465,187	\$19,965,821
6	\$0	\$1,073,000	\$1,073,000	0.666	\$714,985	\$20,680,806
7	\$5,400	\$864,000	\$869,400	0.623	\$541,419	\$21,222,224
8	\$0	\$864,000	\$864,000	0.582	\$502,856	\$21,725,080
9	\$0	\$864,000	\$864,000	0.544	\$469,959	\$22,195,039
10	\$0	\$833,000	\$833,000	0.508	\$423,455	\$22,618,494
11	\$0	\$753,000	\$753,000	0.475	\$357,745	\$22,976,239
12	\$0	\$753,000	\$753,000	0.444	\$334,341	\$23,310,580
13	\$0	\$753,000	\$753,000	0.415	\$312,468	\$23,623,048
14	\$0	\$753,000	\$753,000	0.388	\$292,026	\$23,915,074
15	\$0	\$833,000	\$833,000	0.362	\$301,918	\$24,216,992
16	\$0	\$753,000	\$753,000	0.339	\$255,067	\$24,472,059
17	\$0	\$753,000	\$753,000	0.317	\$238,381	\$24,710,440
18	\$0	\$753,000	\$753,000	0.296	\$222,786	\$24,933,225
19	\$0	\$753,000	\$753,000	0.277	\$208,211	\$25,141,436
20	\$0	\$833,000	\$833,000	0.258	\$215,263	\$25,356,699
21	\$0	\$753,000	\$753,000	0.242	\$181,859	\$25,538,558
22	\$0	\$753,000	\$753,000	0.226	\$169,962	\$25,708,520
23	\$0	\$753,000	\$753,000	0.211	\$158,843	\$25,867,363
24	\$0	\$753,000	\$753,000	0.197	\$148,451	\$26,015,815
25	\$0	\$833,000	\$833,000	0.184	\$153,480	\$26,169,294
26	\$0	\$753,000	\$753,000	0.172	\$129,663	\$26,298,958
27	\$0	\$753,000	\$753,000	0.161	\$121,181	\$26,420,138
28	\$0	\$753,000	\$753,000	0.150	\$113,253	\$26,533,391
29	\$0	\$753,000	\$753,000	0.141	\$105,844	\$26,639,235
30	\$0	\$833,000	\$833,000	0.131	\$109,429	\$26,748,664

30 YEAR TOTAL PRESENT WORTH

\$26,748,664

August 21, 1993

Liz Gupton
2161 S. 10th W.
Missoula, MT 59801

Brian Antonicoli
MT Dept of Health & Env. Sciences
Cogswell Building
Helena, MT 59620

Dear Brian:

I am writing this letter in support of the state's plan, Alternative 5B, as developed in the feasibility study for clean up of the Montana Pole Treatment Plant. This alternative offers the best solution, and I hope the state does not sway towards the less costly alternative 3B. I appreciate the hard work that the Dept. of H&ES has done to develop a long term, effective solution.

RECEIVED

AUG 26 1993

Montana Department of Health
and Environment
Solid and Hazardous Waste Bureau

Sincerely,
Liz Gupton

3
363 7384
Hampis
1993

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES
SUPERFUND SECTION



FAX # (406) 443-7312

MAILING PO Box 200901
ADDRESS: Helena, Montana 59620-0901

STATE OF MONTANA

OFFICE
LOCATION:

CECRA PROGRAM
616 Helena Avenue, Rm 209
Telephone: (406) 443-5827

CERCLA PROGRAM
616 Helena Avenue, Rm 302
Telephone: (406) 449-4067

MEMORANDUM

STATE DOCUMENTS COLLECTION

To: Harold Chambers
From: Brian Antonioli
Date: October 7, 1993

JUN 22 1994

MONTANA STATE LIBRARY
1515 E. 6th AVE.
HELENA, MONTANA 59620

Recently we sent you a copy(s) of the Montana Pole Superfund site Responsiveness Summary. This document presents comments received on the Montana Pole Proposed Plan and responses provided by the Montana Department of Health and Environmental Sciences and the U.S. Environmental Protection Agency.

It has come to our attention that a comment letter in Appendix C was not completely copied or portions were out of place within the appendix. This comment letter [from the Clark Fork Pend Oreille Coalition dated July 7, 1993 with attachment "Permanent Remedies in Superfund"] is attached for your use and should be inserted into the document you received.

We apologize for any inconvenience this oversight may have caused.

Enclosure

PLEASE RETURN

THE
Clark Fork
Pend Oreille
COALITION



Sit: OU mt. Pole
DHES File # 7-01-09-19
Admin. Record: Yes X No
Administrative Record # 5.12
Confidential: Yes No X
Key Words/Comments:

July 7, 1993

RECEIVED

JUL 08 1993

Mr. Brian A. [unclear] Project Manager
Montana Department of Health and
Environmental Sciences
P.O. Box 200901
Cogswell Building
Helena, MT 59620

Montana Department of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau

RE: Montana Pole Treatment Plant Public Comment

Dear Brian:

The Clark Fork - Pend Oreille Coalition supports the State's "Proposed Plan" for remediation of contaminants at the MPTP in Butte, and has identified potential additions and modifications to that plan. Our specific comments are as follows, along with some concerns which might be addressed in the Design/Workplan stage of the process and/or in the Silver Bow Creek/Streamside Tailings OU:

1. Volume: We feel it is essential that all 195,000 cu. yds. of "accessible" soils be excavated and treated, as well as the previously removed 10,000 cu. yds. of soils stored in pole barns on site.

In addition, the Coalition urges excavation of the remaining 10% of contamination, principally under the Interstate 90 overpass. We understand this can be excavated and treated for approximately 10% of the cost of your Proposed Plan, including removal and rebuilding of the highway bridge. The ability to neutralize this remaining 10% for a 10% increase is excellent. It would be inappropriate not to do so.

2. Treatment: We prefer bioremediation, as outlined in the State's Proposed Plan, and underscore the need that this be done in above-ground closed containers so that no harmful chemicals escape to the atmosphere.

Before on-site implementation of any fungal or bacterial remediation, it is suggested laboratory studies be conducted to identify specific end-products of chemical recombinations that occur during fungal or bacterial degradation, thus assuring only non-harmful constituents remain (e.g., CO₂, H₂O).

Because newer technology using White Rot Fungus may reduce cleanup time from 11 to four years, we support investigation of that method before turning to indigenous bacterial remediation.

P.O. Box 7593
Missoula, MT 59807
406/542-0539

P.O. Box 4718
Butte, MT 59702
406/723-4061

P.O. Box 1096
Sandpoint, ID 83864
208/263-0347

3. Protection of Silver Bow Creek: The Coalition adds its voice to that of the State in insisting maximum contaminant levels for drinking water be met on-site.
4. Future Site Use: By honoring historic (residential) use of the site, the State further provides for protection of the creek since this requires water quality standards be met on-site. We understand ARCO hopes to influence the Butte-Silver Bow government to change the pole plant zoning provision that presently allows residential use. Whether or not ARCO is successful, Superfund cleanup standards must not be driven by zoning provision changes that benefit Potentially Responsible Parties through lessened standards for cleanup. The State rightly chooses in its Proposed Plan not to allow Superfund to limit the rights of Butte citizens of hundreds of years from now: by excavating and treating maximum source material, future peoples will likely have an open-ended range of land use possibilities vs. a perpetual heritage of buried hazardous wastes.
5. Affected Public Entities: Water is not static; it is the medium by which contaminants from MPTP have been found "downstream past Rocker" according to Superfund internal file documents. Public comment has been solicited from Butte local government and from citizens residing near the site: cities and citizens downstream have not been approached with information or requests for their opinion of cleanup options. Trustees of the Rocker, Ramsey and Deer Lodge water districts and streamside landowners (especially those who rely on stream and well water for agricultural or domestic purposes) are impacted by MPTP decisions. These folks should be given an opportunity for input on cleanup standards and methods at the MPTP, especially regards their comfort level with the notion of a "reliable" pump-and-treat-in-perpetuity facility.

Migration of contaminants down Silver Bow Creek has occurred for decades. To what extent has DHES and EPA identified PCP's, PAH's, dioxin and furans in its stream, groundwater and sediment investigations throughout the Silver Bow Creek/Clark Fork River Superfund area? What, if any, are the food chain impacts from PCP's (especially), including local cattle and agricultural products? Do the DHES Streamside Tailings OU's tomographic and aerial characterizations of the stream and floodplain indicate where any oil from the pole plant may have collected? And if not already done, perhaps the State and EPA could look into whether or not significant contamination exists above the bedrock plate in the deep triangular soils zone between Silver Bow and Miles Crossing. If so, its potential for migration in a flood or seismic event may warrant analysis.

5. Permanence: The Coalition feels ARCO's preferred alternative, #3, does not meet the requirements of the

Superfund Amendments and Reauthorization Act provisions of the Comprehensive Environmental Response, Compensation and Liability Act. Because CERCLA prompted litigation involving questions of how clean is clean, Congress provided standards in SARA that emphasize its bias for "permanent" cleanup remedies. Land disposal was specifically addressed as a nonpermanent, disfavored treatment technique. To allow contaminants to remain in the ground in a dynamic groundwater locale is not logical under SARA, let alone to allow them to remain there for treatment in perpetuity.

Please refer to the attached research paper, "Permanent Remedies in Superfund" for a discussion of Congressional Intent in SARA. It is clear ARCO's multi-hundred year remedy does not qualify under the law.

We understand financial institutions are unable to provide information regarding interest rates beyond a 30 year period. This information might be considered a helpful indicator to EPA and DHES in determining the length of time operation and maintenance of cleanup facilities may be termed part of a "permanent" solution.

ARCO's option, alternative #3, relies on a man-made nuts, bolts and friction-plagued pump-and-treat facility "in perpetuity," ... "for hundreds and hundreds of years," ... "for an indefinite" period of time. Importantly, such a facility is also reliant on stable national and local economies to assure any funds provided for operation remain available for such purpose, again, in perpetuity. In comparison, the history of the U.S. economy, 200 years, is short. It's major depression, recessions, current national debt, and unknown future effects from pending free trade agreements, etc., would indicate that attempts to fund a perpetual treatment facility may be a very risky challenge to permanence and, therefore, an unacceptable course.

Such a perpetual facility is reliant, also, on likeminded priorities in the year 2500 or 3000, etc. as today from local, state and federal government entities and citizens of Butte. It assumes all will be here and will not have encountered crises that may have caused them to reallocate any trust funds away from MPTP cleanup.

ARCO proposes the pump-and-treat facility at MPTP should run as long as necessary to rid the area of contaminants and acknowledges this will be many hundreds of years at a minimum. Neither ARCO, the United States nor the city of Butte have existed that long. Is it not presumptuous and unfair to force future residents of the area to assume burdens of today's corporate responsible party? Has careful consideration been given to the extent to which future crises or politics may influence the permanence of today's decisions?

in ARCO's "Position on the Montana Pole Plant Cleanup Proposal" handout from the public hearing on May 25, 1993 they propose that after (minor cleanup) excavating and treating what amounts to less than 7% of the "accessible" contamination, they would cap the site. Then, their public literature reads: "The entire area could be planted with grass, trees and shrubs" ... "The surface of this site will be clean, and the contaminants will remain stable below the cap." The groundwater table at the site is known to rise and fall seasonally in a range of two feet, so it is obvious there is a great deal of water movement beneath the site. Therefore, ARCO's statement that there can be stability of contaminants under these circumstances is misleading. And for contaminants to remain below the cap is not a permanent solution.

ARCO's public handout goes on to offer additional aesthetics in lieu of permanence: "Instead of viewing the site as a future residential development, this more practical response encourages the development of a usable park. Creating an attractive park to connect the Pole Plant site with the future Colorado Tailings greenbelt area is entirely feasible under the ARCO preferred plan" ... and "would provide the community with an attractive recreational area, with walking trails and possibly picnic areas." To imply or make an offer to provide grass, trees, shrubs and a park-like setting if their preferred remedy is chosen, is unfair to the citizens of Butte and especially to those downstream who may be adversely impacted by contamination from the site. In asking the Butte-Silver Bow government to endorse its cleanup plan, ARCO attempts, as well, to put local officials in a difficult position, given the extreme economic problems mine closure, mining contamination "moonscapes" and Superfund site designation have brought to the community. The Coalition is pleased the Butte-Silver Bow County Commissioners did not endorse ARCO's preferred alternative despite grave need for reclamation and community enhancement programs such as described by ARCO.

6. Costs: It is curious that ARCO prefers an alternative that is less expensive for the first 30 years than the State's preferred alternative (which, having solved the problem, may be unnecessary after 30 years). Yet, ARCO acknowledges their remedy must be maintained "in perpetuity" -- a period for which costs aren't known or discussed. If impermanent alternatives must be listed, the Coalition urges the State and EPA to provide the public with some indication of the reality of their costs. Perhaps a 200 year cost, 500, 1,000 etc. might be shown. With only the 30 year cost data for all remedies, regardless of the time they take to remediate contaminants, as presented in the "Proposed Plan" document, it is easy for the public to become confused.

In conclusion, the Coalition feels it is incumbent on those

involved to assure present and future generations are not forced to deal with the NPTP site contamination for hundreds and hundreds of years. We believe only a very continually permanent solution will effectively protect human health and the environment. To attempt anything less than excavation and treatment of all source areas would send a message that degradation of water in Montana is acceptable and would set a Superfund precedent of not meeting water quality standards throughout the Clark Fork watershed, from the Berkeley Pit to Milltown.

We greatly appreciate the care and resourcefulness of State of Montana and EPA personnel in development of their preferred remedy and options for this very complex site.

Yours very truly,

Mary Kay Craig
Upper River Field Representative, Butte

cc: C. B. Pearson, Missoula

"PERMANENT" REMEDIES
IN SUPERFUND

A Review of CERCLA, SARA and the National Contingency Plan
Vs. Congressional Intent
With Examples of Application at
The Nation's Largest Superfund Site

Mary Kay Craig
Environmental Law
Montana Tech
March 31, 1993
Rev. June 22, 1993

A dichotomy exists between Congressional intent and application of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) through the Reagan administration's 1990 National Contingency Plan (NCP) and Title 40 Code of Federal Regulations as pertains to "permanent" kinds of remedies. In-field application of the NCP in at least the largest national Superfund site -- the 100-plus miles of contaminated streams and floodplain from the headwaters of Montana's Clark Fork River in Butte to Milltown Dam near Missoula -- bears witness to the need to return to the Act and to Congressional intent to rework EPA's rulemaking with a less industry-biased interpretation of the law.

CERCLA was first enacted in 1980 (United States Code as Title 42, Chapter 103, Sections 9601 through 9675) so that past uncontrolled releases of hazardous substances to the environment might be effectively dealt with by the federal government. It was to be financed by a tax on industries most associated with those substances to create a "super" fund, thereby deemphasizing cost as an impediment to cleanups. Unfortunately, the law said little to guide EPA in what cleanup standards should be applied. Section 104(c)(4) required selection of remedial actions in accordance with the National Contingency Plan "to the extent practicable," emphasizing cost-effectiveness that balances the protection of public health and available funds.

Lack of direction in the law caused much debate on "how clean is clean;" e.g., should contaminated water be treated to strict state standards, less stringent federal standards, or be handled on a case-by-case basis? Similar confusion existed with regard to selection of remedial plans. Evaluation of the "cost-effectiveness" of each was subject to various law suit provoking points-of-view. Section 105(7) of CERCLA directed the NCP to provide "means of assuring that remedial action measures are cost-effective over the period of potential exposure to the hazardous substances or contaminated materials." But the NCP merely responded that "other ... Federal laws ... will generally guide EPA in determining the appropriate "level of cleanup at CERCLA sites" (50 Fed.Reg. 47917 (1985); 40 CFR 300.68 (1986).

Congress was not satisfied. In reauthorizing the Resource Conservation and Recovery Act, it called for a "land ban" on disposal of liquid hazardous waste (42 U.S.C. 6924(d)(1), (g)(5); 51 Fed.Reg. 40572-Nov. 7, 1986). Concurrently, hearings before the Subcommittee on Commerce, Transportation and Tourism of the House Committee on Energy and Commerce on Reauthorization of Superfund (99th Congress, 1st Session, 1985), disclosed transfer of wastes from Superfund sites to leaking RCRA disposal sites. Concerned that CERCLA waste was being moved from one site to another where it might trigger future Superfund work, Congress called for more "permanent" treatment of Superfund waste and less land disposal of waste from Superfund sites.

On October 17, 1980, CERCLA was amended by passage of the Superfund Amendments and Reauthorization Act of 1986 (SARA) (10/17/86 Pub.L 99-499, Stat 1613 et seq.). It increased EPA's response authority and funding, set a cleanup schedule, specified cleanup standards, encouraged settlements between EPA and responsible parties to make the fund stretch further, authorized EPA to issue NCP revisions, and it also expressed Congress' bias in favor of "permanent" treatment.

Under fire for inaction due to legal gridlock, EPA in 1990 wrote a self-management document and then incorporated it into their National Contingency Plan of 1990 (55 Fed.Reg. 8666, 3/8/90). Because the 1990 NCP revisions were so extensive, EPA recodified them with hazardous substance response in 40 CFR Subpart E, Part 300. The key provisions dealing with remedy selection in Subpart E are at 40 CFR 300.430. In revising NCP, EPA noted its "combination of mandates" create "dynamic tensions" in remedy selection policies (53 Fed.Reg. 51422, 12/21/88). In fact, the Contingency Plan addresses specific problems EPA had encountered from PRPs and provides (biased) guidelines for "how clean is clean." Substantive use of the word "permanent" is rare in the NCP.

A CERCLA response under NCP involves seven areas of activity: discovery and notification, assessment, removals, site evaluation, community relations and remedial action. The sixth, remedial action, includes a system for evaluating the "trade offs" among the various remedial options based on nine criteria in three categories. "Threshold criteria" or absolute requirements is the first category and it includes 1) that the remedy protect human health and the environment, and 2) that it comply with ARARs. The second category of criteria are termed "primary balancing" requirements, including: 3) long term effectiveness and permanence; 4) reduction of toxicity, mobility or volume through treatment; 5) short term effectiveness; 6) implementability; and 7) cost. The third category of "modifying criteria" includes 8) State acceptance and 9) community acceptance.

Note that "permanence" is hidden behind the term, "long term effectiveness" in item #3. And one soon learns that even though permanence comes before cost in category two, the order in which they are listed means nothing; in practice they are given equal weight as balancing criteria. The real kicker is that in Reagan-Bush-era EPA, all nine criteria are subject to an over-all umbrella "cost effectiveness" evaluation, allowing "cost" more than a double role in selection of remedy. Where, oh where did the "preference for permanence" go?

Under the big-business-favoring Reagan-Bush Administrations, EPA has promulgated rules that allow for "trade offs" in category two. Permanence is being traded off against cost in defiance of

the intent of Congress. Thickness of the NCP document helps assure obfuscation of this fact, eliminating much opposition. Cost is said to only be used to distinguish among alternatives that fit the threshold requirements, but in so doing, "permanence" becomes relegated to the same weakened ranking as "short-term effectiveness," etc.

Permanence was favored by Congress. First, in Section 104(a)(2) of SARA, Congress indicates its distain for non-permanent solutions by short-circuiting temporary remedies of moving wastes from one Superfund site to another. It requires short-term emergency actions mesh with long-term solutions in order to avoid "wasteful, repetitive, short-term removal actions that do not contribute to the efficient, cost-effective, performance of long-term remedial actions."

Next, a cursory glance at CERCLA's new SARA provision, Section 121, "Cleanup Standards," reveals that "permanent" or "permanently" appears four times on the same page, within the first three paragraphs (100 STAT. 1672). The word, permanent, is assiduously avoided by the Butte-area Superfund site's major responsible party. ARCO refers instead to "long term effectiveness," a term which appears only once in the same three paragraphs.

Closer scrutiny of the context in which these terms are used clearly indicates Congress was not interested in half-measures or partial solutions: Section 121(b)(1) of SARA provides the first general rule, "Remedial actions in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances, pollutants and contaminants as a principal element, are to be preferred," and "the President shall conduct an assessment of permanent solutions and alternative treatment technologies or resource recovery technologies that, in whole or in part, will result in a permanent and significant decrease in the toxicity, mobility or volume of the hazardous substance, pollutant or contaminant. In making such assessment, (he) shall specifically address the long-term effectiveness of various alternatives." The rules go on to delineate seven factors to be taken into account in the assessment, then conclude, "the President shall select a remedial action that is protective of human health and the environment, that is cost effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable."

"Responsible parties" often point out that SARA did not define "permanent." They've been known to say that "long-term effectiveness" means the same thing. Webster's Third New International Dictionary defines "permanent" as: "1) continuing or enduring (as in the same state, status, place) without fundamental or marked change: not subject to fluctuation or

alternation: fixed or intended to be fixed. LASTING; STABLE. 2) ...something conceived of as abiding or eternal." "Long term" on the other hand, is less definite by definition: "extending over or involving a relatively long period of time." Logically, if something is not permanent, it is impermanent. "Impermanent" is defined as "not permanent: not lasting: transient: unstable: soon destroyed." EPA is seriously considering in situ lime treatment of toxic mine tailings along streamsides of Silver Bow Creek and the Clark Fork River. Lime treatment is an old remedy with decades of mitigation history in and around still-dead Silver Bow Creek. It can raise the acidic pH of mine tailings, and it causes heavy metal aquatic-life toxins, copper and zinc, to drop to a sludge at the bottom of a stream. It is not "permanent." "Long term" with luck, its great "impermanence" will be clear with the first unpredictably large runoff of snowmelt, once again killing off fish and other riparian life from Butte to Missoula. Toxins in a flood plain can never be considered static, stable, fixed.

In SARA, one of the seven assessment factors to be considered for remedial alternatives is the "long term uncertainties associated with land disposal." CERCLA language grew from needs based in organic chemical wastes, and only later came to apply to toxic mine wastes. Certainly, a "reasonable man" in law would expect Congress to prefer as permanent, land disposal of fish-killing toxic mine tailings on a high, dry, runoff controlled bench vs. the current repository in the floodplain and streambed of the headwaters of Montana's largest river, a stream now dead from proximity to those minerals. Nevertheless, in implementing SARA, EPA (40 CFR, 300.430(f)(1)(ii)(E)) rules that an alternative that relies on the off-site transport and land disposal of untreated hazardous substances will be the least favored alternative where practicable treatment technologies are available.

CERCLA's 1980 "cost-effectiveness" requirement forced EPA to study cost/benefits of all potential remedies no matter what level of cleanup they could achieve. SARA gave better direction. In the very first sentence of the new provision of 1986 (Section 121(a)), Congress says remedies should be selected "that are in accordance with this section and, to the extent practicable, the National Contingency Plan and which provide for cost-effective response." Clearly, in saying up-front, at the outset, "to the extent practicable" in reference to the National Contingency Plan and cost-effectiveness, Congress intended to subjugate them to the requirements of the section in which the word, "permanent" plays such an undeniably prominent role.

Instead, the Reagan-Bush-era NCP focuses on cost-effectiveness. Time and again in the NCP Final Rule of Feb. 2, 1990, EPA presents pro and con comments received on the proposed rules related to permanence, long-term effectiveness and cost,

only to "drop the ball" in acknowledging permanence. In Section 300.430(c)(1), "Detailed Analysis of Alternatives," Line 8, par. 193 of that document reads, "EPA evaluates permanence to the maximum extent practicable on the degree of long-term effectiveness and permanence afforded by a remedy. Remedies are judged along a continuum, with remedies offering greater or lesser degrees of long-term effectiveness and permanence." EPA consistently lumps "permanence" with "long term effectiveness," something Congress did not do. In defining permanence by use of the word, permanent, and then endowing it with greater or lesser degrees of itself, EPA ignores Webster's "fixed," "abiding," "continuing," "enduring," and "stable" non-ending attributes of the word, and common parlance as well! In Section 300.430, "RI/FS Study and Selection of Remedy," page 107, NCP reads "one group of commenters believes EPA should establish a remedy selection process that adopts as its goal full site restoration and treatment of all material to the extent technically feasible ... (and) limit consideration of cost to the selection of the less expensive of comparably effective treatment technologies." Other commenters here said Superfund "should seek to achieve protection primarily by controlling exposure to current risks through use of engineering and institutional controls," with treatment used only if other controls lack reliability or if the treatment can be done "without a significant increase in cost." In reply EPA said it "sets a course between the two ends of the spectrum reflected in these comments," and then states its goal in a simplistic reiteration of language from SARA: "remedial actions that protect human health and the environment, that maintain protection over time, and that minimize untreated waste." This is pap. It does not diligently address the comments, and is typical of responses throughout the document.

- In Section 121(d)(1) "Degree of Cleanup," Congress employed the term, "at a minimum" regarding the need to protect human health and the environment. Dubious protection is afforded by a remedy that merely subjects to the whims of nature toxic metals that are impermanently "frozen" next to the type of life they threaten. EPA has given little heed to date to the fact that lime treatment of heavy metals frees and makes more available in groundwater the human-carcinogenic lightweight metal, Arsenic 5. And lime treatment's impermanence is also challenged by tiny diatom algae. Despite the multimillion dollar lime treatment facility built between dead Silver Bow Creek and the Clark Fork River, these algae are believed to lift and carry over the dam toxic copper and zinc from the bottom of the Warm Springs Ponds, continuing the fatal threat to aquatic life that results in massive fish kills or low numbers of fish and absence of native wild fish.

In 121(d)(2)(a)(ii), Congress uses the term, "at least," twice in the same sentence to underscore need for selected remedies to meet Applicable Relevant and Appropriate Requirements (any other

permitted laws), as well as the "Maximum" (1987) of the Safe Drinking Water Act, and the Clean Water Act. However, the National Environmental Policy Act gives EPA the "practical" authority to allow variances from these standards on a case-by-case basis.

Close on the heels of enactment of SDA, "Environment & Reporter" in a special report on "Superfund II" (Part II, Vol. 17, No. 42 of February 13, 1987 published by the Bureau of National Affairs) states on pg. 40: "Section 121(b)'s 'preference' for application of a 'permanent solution' at Superfund sites 'to the maximum extent practicable' is one of the most critical aspects of the new law." The report recognizes that House and Senate leaders did little to clarify the interplay between the bias in favor of 'permanent' treatment and evaluation of effectiveness of proposed remedies. It goes on to provide insight to Congressional intent by explaining what took place on the floor of House and Senate: "Members divided themselves into two camps. They either emphasized that the statute's cost-effectiveness requirement should be relied upon to avoid overly expensive, unrealistic 'permanent' treatment approaches, or they argued that the strong preference in the amendments for permanent treatment cannot be overridden by cost considerations."

Senator John Chafee (R-RI), felt preference for permanent treatment means "permanent treatment technologies must be chosen whenever they are feasible and achievable." He pointed out that permanent treatment preference is a separate requirement that must be met before the cost-effectiveness test is applied lest remedies such as capping a site or building a slurry wall to prevent further leakage would always be selected as a cheaper alternative. Chafee stated, "The extent to which a particular technology or solution is feasible or practicable is not a function of cost. A determination that a particular solution is not practicable because it is too expensive would be unlawful" (Cong. Rec. S 14925 (Oct. 3, 1986)).

Rep. Norman F. Lent (R-NY) disagreed: "It is our intent that the Administrator take into account several factors in determining whether a solution is practicable, including technical feasibility, cost, State and public acceptance of the remedy and other appropriate criteria" (132 Cong. Rec. H. 9566 Oct. 8, 1986).

Sen. George J. Mitchell (D-Maine) interpreted "permanent and significant reduction" to require the "lowest levels achievable with available technologies" (Cong. Rec. S 14914 Oct. 3, 1986). In response, Lent said, "rather, it requires the EPA to carefully consider permanent remedies and select a permanent solution to the maximum extent practicable, if it provides a cost-effective response and if it protects the public health and the environment." In other words, although this section

selection of remedy, usually the one where a "cost-effective remedy" could be used. (H.R. Rep. No. 253, 99th Cong., 1st Sess.)

Split interpretation also resulted from the House Committee on Energy and Commerce and the House Committee on Public Works and Transportation. Energy and Commerce adopted a cleanup standard that required protection of human health regardless of cost; cost effectiveness was for use in choosing among remedies that met the basic health standard. They also required that the long-term costs of non-permanent treatment be included in evaluating cost-effectiveness, and that otherwise cost-effective remedies must use permanent solutions to the maximum extent practicable (H.Rep. 253, 99th Cong. 1st Sess). A few members of the above Committee rejected this approach. They wanted to require, not just suggest, EPA apply permanent remedies whenever such were "feasible and achievable." They felt cost-effectiveness could be considered with regard to "feasibility" of a permanent solution, but sought to mandate permanent solutions whenever possible.

The Public Works and Transportation Committee adopted the opinion of the vocal minority from the Energy and Commerce Committee. They recommended approach considered cost effectiveness, but mandated EPA select permanent treatment "to the maximum extent practicable" whenever permanent treatment is "feasible and achievable." In the case that permanent treatment might be prohibitively expensive, they would require an "interim solution" be selected where permanent is not feasible, achievable and practicable (H.Rep No. 253, 99th Cong., 1st Sess).

The final language of the statute is considered to be a compromise between the two above approaches. By contrast, and as shown above, language in the 1990 National Contingency Plan switches emphasis from "permanence" to "cost effectiveness" and dilutes Congressional intent far beyond even the most extreme interpretations cited by "Environmental Reporter" above.

A good example of a proposed remedy that flies in the face of Congressional intent is ARCO's preferred remedy for the Montana Pole Treatment Plant Superfund site in Butte. The State/EPA proposed plan calls for excavation and destruction of the cancer-causing toxins through which groundwater flows into Silver Bow Creek. ARCO prefers to cap the site and rely on a groundwater pump-and-treat facility forever rather than spend an additional seven to 20 million of "today's dollars" for the permanent remedy. Actual cost of ARCO's plan would obviously be far more than the permanent cleanup, but this is not recognized because of EPA's policy to show only 30 year costs.

What will happen in the future to assure impermanent

remedies. State and local governments are encouraged to accept responsibility for management and repair of such facilities as Anaconda's Old Works, capped by a "mazy golf course." Such "institutional controls" are all burdened on the backs of the local citizens. The presumption that men can control events in geologic time, for though no engineers will state there is such a thing as an impervious repository, waste for Beryllium and arsenic buried on Smelter Hill in Anaconda will be "reviewed every five years for a while until someone decides enough is enough" according to a top EPA official.

In conclusion, EPA has mismanaged the intent of Congress in SARA by promulgating a National Contingency Plan and CER's that ignore the strong sentiments of Congress for permanent remedies. This is wasteful, too, in that it encourages costly litigation and resultant delays. As long as political appointees heading major agencies such as EPA are able to influence regulatory language, individual citizens must take an active role in even the semantics of legal terminology if they are to be treated fairly versus big buck legal departments and lobbying activities of profit-motivated, conscienceless, corporate citizens.

Change is needed in Superfund -- but it must be change that reflects what was intended in the first place: permanent remedies.

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